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EGLIN AFB, FLORIDA

RANGE REFERENCE ATMOSPHERE
0-30 KM ALTITUDE

AUGUST 1983

METEOROLOGY GROUP

RANGE COMMANDERS COUNCIL

WHITE SANDS MISSILE RANGE
KWAJALEIN MISSILE RANGE
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FOREWORD - see attached.

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EGLIN AFB, FLORIDA

RANGE REFERENCE ATMOSPHERE
0-30 KM ALTITUDE

August 1983

Prepared by

Range Reference Atmosphere Committee
Meteorology Group
Range Commanders Council

Published by

Secretariat
Range Commanders Council
White Sands Missile Range, New Mexico 88002

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LIST OF ORGANIZATION ACRONYMS

AD	Armament Division
AFFTC	Air Force Flight Test Center
AFSC	Air Force Systems Command
AFSC/AFGL	AFSC/Air Force Geophysics Laboratory
AFSC/SD	AFSC/Space Division
AFSCF	Air Force Satellite Control Facility
AFTFWC	Air Force Tactical Fighter Weapons Center
AWS	Air Weather Service
BMD	Ballistic Missile Division
DOD	Department of Defense
DOE	Department of Energy
DOE/NTS	DOE/Nevada Test Site
DPG	Dugway Proving Ground
ESMC	Eastern Space and Missile Center
ETR	Eastern Test Range
KMR	Kwajalein Missile Range
NASA	National Aeronautics and Space Administration
NASA/MSFC	NASA/Marshall Space Flight Center
NASA/WFC	NASA/Wallops Flight Center
NOAA	National Oceanic and Atmospheric Administration
NWC	Naval Weapons Center
PMTC	Pacific Missile Test Center
USA/DTC	U.S. Army/Deseret Test Center
USAECOM	U.S. Army Electronics Command
USAFETAC	United States Air Force Environmental Technical Applications Center

UTTR	Utah Test and Training Range
WSMC	Western Space and Missile Center
WSMR	White Sands Missile Range
WTR	Western Test Range
YPG	Yuma Proving Ground
6585TG	6585th Test Group
TSCF	Targeting Systems Characterization Facility

FOREWORD

Atmospheric parameters are essential to the research and development of missiles and aerospace vehicles. In the early 1960's, the need was recognized for realistic atmospheric models derived in a consistent manner for each of the several major test ranges. An atmospheric model derived from statistical data for a particular geographical location is referred to as a reference atmosphere.

The first Range Reference Atmosphere (RRA) was issued in 1963 by the Inter-Range Instrumentation Group (IRIG) for Cape Kennedy, Florida, and was followed by additional publications for several ranges up to 1974. Since that time, improved upper air data bases have become available from which to develop the RRA. These resulted from the extended period of records and from improvement in the upper air measuring program by rocketsondes for altitudes above the rawinsonde ceiling of 30 km. Revised and improved RRAs are justified for the following reasons:

1) Needs for more definitive statistical atmospheric models have arisen because of changes and advances in aerospace technology. The Space Transportation System (Space Shuttle) is one example.

2) Most ranges now have an extended and improved upper air data base from which to develop a more definitive RRA.

3) There are requirements for RRAs for new ranges and range sites.

4) There have been scientific advances in understanding the upper atmospheric structure and physical relationships.

5) Advances in statistical modeling techniques have been made because of the general availability of high-speed electronic computers. These have led to the adoption of advanced concepts in atmospheric modeling.

For these reasons, the Range Reference Atmosphere Committee (RRAC) was tasked by the Range Commanders Council Meteorology Group (RCC MG) to establish new and improved RRAs. The purpose, scope, and objectives of this task are outlined in the following paragraphs.

Purpose: This committee, Task MG-1, establishes RRAs for the several ranges as provided by the RCC. An RRA is a model of the Earth's atmosphere over a geographical location of interest, for use by DOD and other U.S. Government range users. The RRA is used to provide planning data for evaluating environmental constraints for the particular configurations of environment-sensitive systems and components being developed or undergoing tests.

Scope: Using the best available upper atmosphere data base to include rawinsonde, rocketsonde and possibly other high-altitude data sources for the range location, the task is to establish a model of certain statistics for wind and thermodynamic quantities derived in a uniform manner and published in a standardized format.

Objectives: The wind statistics shall be, insofar as practical, modeled to be consistent with rigorous mathematical probability properties of the multivariate normal probability theory. The thermodynamic quantities statistics shall be, insofar as practical, modeled to be consistent with the hydrostatic equation, the equation of state, and the probability principles that are related through these physical equations. The document shall serve as an authoritative source of information and as an atmospheric model for a particular range. The first in the series of revised RRAs to be published is for Kwajalein Missile Range (KMR) (publication date [illegible]ber 1982). The altitude range required for KMR is 0 to 70 km. The order of priority for the subsequent publications is:

	Range	Altitude Range Required
1.	AFFTC/Edwards AFB, CA	0 - 70 km[a]
2.	ESMC/Cape Canaveral AFS, FL	0 - 70 km
3.	WSMC/Vandenberg AFB, CA	0 - 70 km[a]
4.	WSMR/White Sands, NM	0 - 70 km
5.	PMTC/Point Mugu, CA	0 - 70 km
6.	UTTR/Dugway (Michael AAF), UT	0 - 30 km[b]
7.	AD/Eglin AFB, FL	0 - 30 km
8.	ESMC/Ascension Island	0 - 70 km (Terminates at 66 km because of insufficient data)
9.	NASA/Wallops Flight Center, VA	0 - 70 km
10.	Taquac (Guam)	0 - 30 km
11.	PMTC/Barking Sands, HI	0 - 70 km

In keeping with the RCC's objective of standardization, the modeling techniques, basic text, and tabulation format are to be the same for all RRAs. These new and revised RRAs present not only the mean values of the thermodynamic quantities (pressure, temperature, virtual temperature, and density), but also include statistical measures for the dispersion (i.e., standard deviations and skewness coefficients). New quantities presented are water vapor pressure and dewpoint temperature. The statistical modeling for the wind is entirely new. The new approach uses the properties of the bivariate normal probability distribution function.

a. Use rocketsonde data from PMTC/Point Mugu for altitudes above 30 km.
b. Consider augmenting data base from Ely or Salt Lake City.

All final computations were performed by the United States Air Force Environmental Technical Applications Center (USAFETAC) in response to a task from Eastern Space and Missile Center (ESMC).

The text was prepared jointly by USAFETAC and the NASA/George C. Marshall Space Flight Center's Space Sciences Laboratory, Atmospheric Sciences Division. The editing and preparation of the draft manuscript were performed by the NASA/MSFC organization.

The cochairmen express their gratitude to all RRAC members and their respective colleagues who have made significant technical contributions to the establishment of these RRAs.

Special thanks are tendered to Lt. B. Novograd for his dilligence in forming the many computations and the development of the primary tables, I through IV. Special thanks goes to Lt. F. Wirsing for editing and formulating the equations for the derivable thermodynamic equations. These gentlemen performed this outstanding work under the direction of Major B. Lilius, USAFETAC.

Grateful acknowledgment goes to Mrs. Annette Tingle, NASA/MSFC, for editing the draft manuscript.

The RRAC consists of representatives from the U.S. Air Force, U.S. Army, National Aeronautics and Space Administration, U.S. Navy, and National Oceanic and Atmospheric Administration. The committee members for the RRA for the first publication are:

G. G. Boire, WSMC
O. H. Daniel, ESMC
R. de Violini, PMTC
F. G. Finger, NOAA/NWS
E. E. Fisher, HQ AFSC
B. R. Hixon, PMTC
J. M. Hobbie, KMR
E. J. Keppel, AD
S. F. Kubinski, WSMR
F. J. Schmidlin, NASA/WFC

O. E. Smith Cochairman, NASA/MSFC	Maj. B. W. Galusha Cochairman, USAF/ETAC

CHAPTER I. INTRODUCTION

A. Definition and Purpose of the Range Reference Atmosphere

A.1 Definition

A reference atmosphere is a statistical model of the Earth's atmosphere derived from upper air measurements over a particular geographical location. Hence, these Range Reference Atmospheres (RRAs) are atmospheric models developed by the Range Reference Atmosphere Committee (RRAC) in response to a task by the Range Commanders Council Meteorology Group (RCC MG) and published by the RCC Secretariat. The RCC MG, formerly called the Inter-Range Instrumentation Group/Meteorology Working Group (IRIG/MWG), published a series of RRAs during the period 1963 through 1974.

A.2 Purpose

A series of revised and expanded RRAs are to be published for locations of interest to the RCC. These publications are to serve as authoritative reference sources on certain upper air statistics and as atmospheric models for particular range sites. The technical usefulness of these documents for the ranges, range users, U.S. aerospace industries, and the scientific community is recognized because of the standardization of the development techniques and the presentation of the tabulations.

B. Scope of the Range Reference Atmosphere and Arrangement of Tables

B.1 Scope

The RRA contains tabulations for monthly and annual means, standard deviations, and skewness coefficients for windspeed, pressure, temperature, density, water vapor pressure, virtual temperature, and dewpoint temperature; the means and standard deviations for the zonal (U) and meridional (V) wind components; and the linear (product moment) correlation coefficient between the wind components. These statistical parameters are tabulated at the station elevation, at 1-km intervals from sea level to 30 km, and at 2-km intervals from 30 to 90 km. The wind statistics are given at approximately 10 m above the station elevations and at altitudes with respect to mean sea level thereafter. For those range sites without rocketsonde measurements, the RRAs terminate at 30 km altitude, or they are extended, if required, when rocketsonde data from a nearby launch site are available. There are four sets of tables for each of the 12 monthly reference periods and the annual reference period.

B.2 Arrangement of Tables

The statistical parameters for the RRA models are presented in four tables, as outlined in the following paragraphs.

Table I contains all the wind statistical parameters. This table gives the monthly and annual means and standard deviations of the U and V wind components and the linear (product moment) correlation coefficient between these

two components; the mean, standard deviation and skewness coefficient of the windspeed; and the number of wind observations (sample size).

Table II contains the monthly and annual means, standard deviations, and skewness values of pressure, temperature, and density, and the number of observations used for each of these thermodynamic quantities.

Table III contains the monthly and annual means, standard deviations and skewness values of the water vapor pressure, virtual temperature and dewpoint, and the number of observations for each of these moisture-related quantities. The statistical parameters for water vapor pressure and dewpoint terminate at 15 km altitude. Above 15 km the statistical parameters for virtual temperature are considered to be the same as those for temperature.

Table IV contains the monthly and annual mean atmospheric models for the thermodynamic variables: pressure, virtual temperature, and density. This table is derived from the monthly and annual mean virtual temperature versus altitude (geometric) using the hydrostatic equation and the equation of state. Also presented is the geopotential height corresponding to the tabulated geometric altitudes.

The physical unit for all wind parameters is meters per second. The physical unit for pressure is millibars; for temperature and virtual temperature, degrees Kelvin; for density, grams per cubic meter; and for water vapor pressure, millibars. In all cases the skewness coefficient and the correlation coefficient between wind components are unitless. All reference to altitude is geometric altitude and is expressed in kilometers. All reference to height is geopotential height and has the unit geopotential meters or kilometers. All geometric altitudes and geopotential heights are with respect to mean sea level.

C. Data Quality Control Procedures

A small portion (less than 10 percent) of the soundings in the data base used to calculate the RRA tables contained erroneous data values. The soundings which contained these erroneous values were eliminated from the data base using the following procedures:

1) Soundings containing gaps in their height data greater than 200 mb were rejected. This step was taken because some soundings only contained height values at their "mandatory" pressure levels, which were occasionally missing, resulting in soundings with no height information at all.

2) An initial set of RRA statistics was computed using all the remaining soundings. This initial set of statistics was used to determine data limits for the temperature, pressure, U and V components of the wind, and the dewpoint (for the 0- to 30-km portion of the RRA) or the density (for the 30- to 90-km portion of the RRA). The lower (upper) data limits were set at the mean value for a specific parameter, minus (plus) six standard deviations of that quantity. One pair of data limits was computed for each of these parameters: month of the year and data level.

3) This initial set of data limits was then used to screen the data base. All the soundings that contained values outside these data limits were rejected. A new RRA was then computed using the screened data base. This second RRA was used to generate a second set of data limits.

4) The second set of data limits was then used to screen the data base further. A new RRA was again generated. The skewness values in this RRA were then evaluated, according to empirical criteria specified in section II.A.3 of this document for the winds, and according to criteria in section III.A.3 for the thermodynamic quantities. If these criteria were satisfied, the new RRA was then used to generate a final set of data limits, which were used to control the quality of the data base for the final version of the RRA.

5) Occasionally, the third RRA that was generated did not satisfy all of the skewness criteria. This indicated that some incorrect values were still present in the data base. To complete quality control, steps 3 and 4 were repeated for additional iterations (usually one or two) until the resulting RRA satisfied the skewness criteria. At that point, a final set of data limits was generated. This final set of data limits was then used to control the quality of the data base and generate the final RRA.

D. Organization of the Chapters

Because there are plans to publish a series of RRAs, comments on the special organization of the document are in order. The RRA document is arranged in four chapters. Chapter I is the introduction. Chapter II, Wind Statistics and Models, contains the techniques used to arrive at the wind statistical parameters, table I, and the probability functions that are to be used as wind models to derive several wind statistics. Chapter III, Statistics of Thermodynamic Quantities and Models, contains the techniques used to arrive at the thermodynamic and moisture-related statistical parameters given in tables II and III and the atmospheric thermodynamic model presented in table IV. This chapter also contains sets of equations to calculate several atmospheric properties. Chapter IV contains the general conclusions and recommendations. These four chapters are reprinted without change for each documented RRA to assure consistency and for expediency in preparing the documentation. To account for variations particular to a specific RRA, two appendixes have been included. Appendix A, Examples of Wind Statistics, is designed to give a few illustrative examples of wind statistics for the specific RRA and cursory observations, comparisons, or comments on wind statistics. Appendix B, Range Specific Information, is designed to present specific information particular to the range, such as geographical location, data base, etc., and any cursory observations or comments on the thermodynamic quantities.

Read these appendixes! They are located as the last two units in the document because they may vary in length depending on the circumstances. Appendixes A and B and tables I, II, III, and IV are the only differences among the RRA documents published in this new RRA series.

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CHAPTER II. WIND STATISTICS AND MODELS

A. General Considerations

A.1. Objectives

An objective of the RRA is to furnish minimum tabulation for the wind statistics. To meet this objective, the bivariate normal probability distribution was adopted as a statistical model for the wind treated as a vector quantity at the RRA data levels. Only five statistical parameters are required to completely describe this probability function. In Cartesian coordinates these parameters are the means and standard deviations of the two orthogonal components and the correlation coefficient between the two components. These five statistical parameters for the U and V (meteorological coordinates) components are given in table I. The statistical properties of the bivariate normal probability distribution are used to derive many wind statistics that are of interest to the ranges and range users. This procedure produces consistent wind statistics that are connected through rigorous mathematical probability functions. By using these functions, extensive tabulations of wind statistics are avoided.

The statistical properties of the bivariate normal probability distribution presented for the vector wind statistical model are:

1) The wind components are univariate normally distributed.

2) The conditional distribution of one component given a value of the other component is univariate normally distributed.

3) The windspeed is of the form of a generalized Rayleigh distribution.

4) The frequency distribution of wind direction can be derived.

5) The conditional distribution of windspeed given a value of wind direction (wind rose) can be derived.

6) The five tabulated wind statistical parameters with respect to the meteorological U and V coordinate system can be derived for any arbitrary rotation of the orthogonal axes.

The probability distribution functions and sets of equations to derive wind statistics for the previously stated properties of the vector wind model are presented in this chapter. Symbols used are summarized in table A. Illustrative examples are presented in appendix A. No attempt is made to give the derivation of the probability functions. The reader is referred to Smith (1976) for some derivations and several applications of the probability distribution properties for wind statistics.

A.2. Data Quality Control

The U and V components of the wind were used to generate data limits set at plus and minus six standard deviations from the mean for each of the

TABLE A. LIST OF SYMBOLS USED IN CHAPTER II

N - The number of wind measurements in table I

r - A general variable for the bivariate normal probability distribution in polar coordinates

R - A generalized Rayleigh variable used for derived windspeed probability distribution

R (U, V) - The linear (product moment) correlation coefficient between the zonal and meridional wind components in table I

SK (W) - Skewness parameter for windspeed in table I

S (U) - The standard deviation of the zonal wind component in table I

S (V) - The standard deviation of the meridional wind component in table I

S (W) - The standard deviation of windspeed in table I

t - A standardized normal variate used in text table B

U - The zonal wind component

UBAR - The mean value of the zonal wind component in table I

V - The meridional wind component

VBAR - The mean value of the meridional wind component in table I

W - Windspeed or modulus of wind vector, a scalar quantity

WBAR - The mean value of windspeed in table I

X - A general component variable or coordinate axis

Y - A general component variable or coordinate axis

$\bar{X}$ - A general component mean value in the [x,y] coordinate system

$\bar{Y}$ - A general component mean value in the [x,y] coordinate system

α (alpha) - Rotation angle for the [x,y] coordinate system

TABLE A. (concluded)

θ (theta) - Wind direction in the polar coordinate system
$\lambda_{(\ )}$ (Lambda) - A parameter in the bivariate normal probability distribution in text table C
ξ (Xi) - The mean value in the standardized normal probability distribution used in text table B
π (Pi) - Constant = 3.14159 ...
ρ (Rho) - The general linear correlation coefficient between the two component variables in the [x,y] coordinate system
σ_x, σ_y - The general standard deviations of the x and y component variables in the [x,y] coordinate system.

quantities. These data limits were used to screen the wind data base, as described in section I.C. The data base was considered to be free from errors under the following conditions:

1) The skewness of the windspeed was below 4.0 at data levels where the mean windspeed was less than 15 m/s, and

2) The skewness of the windspeed was below 2.5 at data levels where the mean windspeed was greater than 15 m/s.

A.3 Limitations

For the wind statistics, the correlation coefficients for like wind components and unlike wind components between altitude levels were not computed. Therefore, wind statistics with respect to altitude (profile) cannot be derived from the RRA statistics. For wind profile modeling techniques the user is referred to Smith (1976). However, the wind statistics at discrete altitudes are valid; all of the probability distribution functions given in chapter II can be derived from the five wind component statistical parameters contained in table I, and the derived distributions can be considered as wind models at discrete altitudes.

By convention, in the statistical literature Greek letters are used for population or theoretically known parameters, and sample estimates are denoted by English alphabetical letters or with a "hat" (^) over the Greek letters. In chapter II Greek letters are used for the variances and the linear correlation coefficient, and the means are denoted by $\overline{X}$ and $\overline{Y}$ when dealing with the bivariate normal distribution. It will always be understood that table I contains sample estimates of the statistical parameters and they are with respect to the meteorological U and V coordinate system.

B. Coordinate System and Computation of Statistical Parameters

B.1. Coordinate System

Wind measurements are recorded in terms of magnitude and direction. The wind direction is measured in degrees clockwise from true north and is the direction from which the wind is blowing. The wind magnitude (the modulus of the vector) is the scalar quantity and is referred to as windspeed or scalar wind. A statistical description that accounts for the wind as a vector quantity is appropriate and requires a coordinate system.

For the RRA the standard meteorological coordinate system has been chosen for the wind statistics, all tables of statistical parameters, and related discussions because the coordinate system used in aerospace and related applied fields has not always been consistent.

Using figure 1, the polar and Cartesian forms for the meteorological coordinate system are defined:

W = windspeed, scalar wind, or magnitude of the wind vector in meters per second.

θ = wind direction. θ is measured in degrees clockwise from true north and is the direction from which the wind is blowing.

U = zonal wind component, positive west to east, in meters per second.

V = meridional wind component, positive south to north, in meters per second.

The components θ and W define the polar form, and the U-V components define the Cartesian forms:

$$U = -W \sin\theta \quad , \quad 0 \leq \theta \leq 360^{\circ} \tag{1}$$

$$V = -W \cos\theta \quad . \tag{2}$$

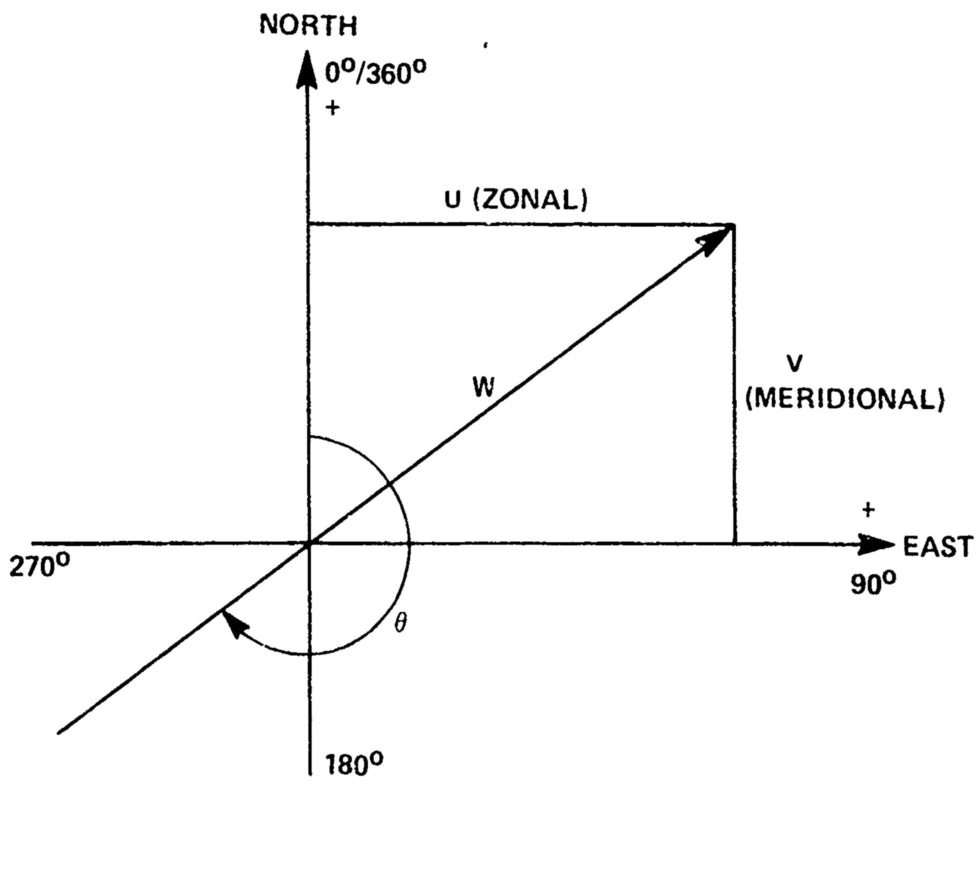

Figure 1. The meteorological coordinate system.

It is helpful to note the difference between the mathematical convention for a vector direction and the meteorological convention for wind direction:

$$\theta \text{ met} = 270 - \theta \text{ math} \qquad (3)$$

when $0 \leq \theta$ math $\leq 270°$

$$\theta \text{ met} = 360 + (270 - \theta \text{ math})$$

when $270 \leq \theta$ math $\leq 360°$

B.2 Computation of Statistical Parameters

The wind statistical parameters in table I for the means and standard deviations of the U and V wind components and windspeed and the skewness parameter of windspeed were computed using the sums technique presented in chapter III.C.3. In addition, the linear (product moment) correlation coefficient between the U and V wind components, r (u,v) in table I, was computed. This correlation coefficient is defined as

$$r\,(u,v) = \frac{\sum_{i=1}^{n} (U_i - \bar{U})\,(V_i - \bar{V})}{N\, s(u) \cdot s(v)} \quad . \qquad (4)$$

These statistical parameters are with respect to the Standard Meteorological Coordinate System.

C. Statistical Wind Models

C.1. Wind Component Statistics

The univariate normal (Gaussian) probability distribution function is used to obtain wind component statistics. In generalized notations, this probability density function (pdf) is

$$f\,(t) = \frac{e^{-\frac{t2}{2}}}{\sqrt{2\pi}} \quad , \qquad (5)$$

where $t = X - \xi/\sigma_X$ is the standardized variate, with ξ defining the mean and σ_X the standard deviation. The probability distribution function (PDF) is

$$F(X) = \int_{-\infty}^{X} f(t)\, dt \quad . \qquad (6)$$

Because this integral cannot be obtained in closed form, it is widely tabulated for zero mean and unit standard deviation. For a convenient reference for the RRA, selected values of F(X) are given in table B. To emphasize the connotation of probability, F(X) is shown in table B as $P\left\{X\right\}$.

The t values in table B are used as multiplier factors to the standard deviation to express the probability that a normally distributed variable, X, is less than or equal to a given value as

$$P\left\{X \leq \text{mean} + t\ \sigma_X\right\} = \text{probability, } p \quad . \tag{7}$$

For example, when t = 1.6449, the probability that X is less than or equal to the mean plus 1.6449 standard deviations is 0.95. That value of X that is less than or equal to the mean plus 1.6449 standard deviations is called the 95th percentile value of X. Also given in table B are the numerical values to express the probability that X falls in the interval X_1 and X_2; i.e.,

$$P\left\{X_1 \leq X \leq X_2\right\} = \text{Interpercentile Range} \ , \tag{8}$$

where

$$X_1 = \bar{X} - t\ \sigma_X$$
$$X_2 = \bar{X} + t\ \sigma_X \quad .$$

For t = 1.9602 the probability that X lies in the interval X_1 and X_2 is 0.95. The values of X_1 and X_2 in this example comprise the 95th interpercentile range.

For a normally distributed variable, the mode (most frequent value) and the median (50th percentile value) are the same as the mean value. The means and standard deviations of the U and V wind components from table 1 are used in equations (7) and (8) to compute the percentile values and interpercentile ranges of the U and V wind components. When equation (7) is illustrated on a normal probability graph, a straight line is formed.

C.2. The Vector Wind Model

Because wind is a vector quantity having direction and magnitude that can be expressed as two components in an orthogonal coordinate system, a probability model that describes the joint relationship is the bivariate normal probability distribution. In general component notation, the bivariate normal probability density function (BNpdf) is

TABLE B. VALUES OF t FOR STANDARDIZED NORMAL (UNIVARIATE) DISTRIBUTION FOR PERCENTILES AND INTERPERCENTILE RANGES

t	P(X)	X	$P\{X_1 < X < X_2\}$ (%)
-3.0000	0.00135	$\xi - 3.0000\,\sigma$	
-2.5758	0.00500	$\xi - 2.5758\,\sigma$	
-2.3263	0.01000	$\xi - 2.3263\,\sigma$	
-2.2365	0.01266	$\xi - 2.2365\,\sigma$	
-2.0000	0.02275	$\xi - 2.0000\,\sigma$	
-1.9602	0.02500	$\xi - 1.9602\,\sigma$	
-1.6449	0.05000	$\xi - 1.6449\,\sigma$	
-1.2816	0.10000	$\xi - 1.2816\,\sigma$	
-1.0000	0.15866	$\xi - 1.0000\,\sigma$	
-0.8416	0.20000	$\xi - 0.8416\,\sigma$	
-0.6745	0.25000	$\xi - 0.6745\,\sigma$	
-0.2533	0.40000	$\xi - 0.2533\,\sigma$	
0.0000	0.50000	ξ	
0.2533	0.60000	$\xi + 0.2533\,\sigma$	20 (80)
0.6745	0.75000	$\xi + 0.6745\,\sigma$	50 (50)
0.8416	0.80000	$\xi + 0.8614\,\sigma$	60 (40)
1.0000	0.84134	$\xi + 1.0000\,\sigma$	68.268 (31.732)
1.2816	0.90000	$\xi + 1.2816\,\sigma$	80 (20)
1.6449	0.95000	$\xi + 1.6449\,\sigma$	90 (10)
1.9602	0.97502	$\xi + 1.9602\,\sigma$	95 (5)
2.0000	0.97725	$\xi + 2.0000\,\sigma$	95.45 (4.55)
2.2365	0.98734	$\xi + 2.2365\,\sigma$	97.468 (2.532)
2.3263	0.99000	$\xi + 2.3263\,\sigma$	98 (2.00)
2.5758	0.99500	$\xi + 2.5758\,\sigma$	99 (1.00)
3.0000	0.99865	$\xi \;\; 3.0000\,\sigma$	99.73 (0.27)

where $X_1 = \xi - t\sigma$
and $X_2 = \xi + t\sigma$

$$f(X,Y) = \frac{1}{2\pi\sigma_x\sigma_y\sqrt{1-\rho^2}}\left[\exp\frac{-1}{2(1-\rho^2)}\left\{\frac{(X-\bar{X})^2}{\sigma_x^2} - \frac{2\rho(X-\bar{X})(Y-\bar{Y})}{\sigma_x\sigma_y} + \frac{(Y-\bar{Y})^2}{\sigma_y^2}\right\}\right] \quad -\infty \leqq X \leqq \infty \text{ and}$$

$$-\infty \leqq Y \leqq \infty \quad , \tag{9}$$

where the five parameters are $\bar{x},\bar{y}$, the component means; σ_x, σ_y, the component standard deviations; and ρ, the correlation coefficient between the two component variables, X and Y.

For many applications the interest is in determining the probability that a point $\{X,Y\}$ will fall within a contour of equal probability density. The exponential terms of equation (9), when set equal to a constant, λ^2, give a family of ellipses depending on the value of the constant. The ellipses have a common center at the point $\{\bar{X},\bar{Y}\}$. Integration of equation (9) over the region bounded by the contours of equal probability density gives

$$P(\lambda) = 1 - e^{\frac{-\lambda^2}{2(1-\rho^2)}} \quad . \tag{10}$$

Solving for λ^2 and replacing $P(\lambda)$ by p gives

$$\lambda^2 = -2\,(1-\rho^2)\ln(1-p) \quad . \tag{11}$$

Now define

$$\lambda_e = \sqrt{2}\,\sqrt{-\ln(1-p)} \quad . \tag{12}$$

For ready reference and comparisons, λ_e is shown in table C for selected values of p.

TABLE C. VALUES OF λ FOR BIVARIATE NORMAL DISTRIBUTION ELLIPSES AND CIRCLES

P(%)	λ_e (ellipse)	λ_c (circle)	P(%)	λ_e (ellispe)	λ_c (circle)
0.000	0.0000	0.0000	65.000	1.4490	1.0246
5.000	0.32[illegible]3	0.2265	68.268	1.5151	1.0713
10.000	0.4590	0.3246	70.000	1.5518	1.0973
15.000	0.5701	0.4031	75.000	1.6651	1.1774
20.000	0.6680	0.4723	80.000	1.7941	1.2686
25.000	0.7585	0.5363	85.000	1.9479	1.3774
30.000	0.8446	0.5972	86.466	2.0000	1.4142
35.000	0.9282	0.6563	90.000	2.1460	1.5175
39.347	1.0000	0.7071	95.000	2.4477	1.7308
40.000	1.0108	0.7147	95.450	2.4860	1.7579
45.000	1.0935	0.7732	98.000	2.7971	1.9778
50.000	1.1774	0.8325	98.168	2.8284	2.0000
54.406	1.2533	0.8862	98.889	3.0000	2.1213
55.000	1.2637	0.8936	99.000	3.0348	2.1460
60.000	1.3537	0.9572	99.730	3.4393	2.4320
63.212	1.4142	1.0000	99.9877	4.2426	3.0000

$$\lambda_e = \sqrt{2}\,\sqrt{-\ln\,(1 - P)}$$

$$\lambda_c = \sqrt{-\ln\,(1 - P)}$$

The probability ellipse that contains p-percent of the wind vectors expressed in the most general form is the conic defined by

$$AX^2 + BXY + CY^2 + DX + EY + F = 0 \quad , \tag{13}$$

where

$$A = \sigma_y{}^2$$

$$B = -2\rho\sigma_x\sigma_y$$

$$C = \sigma_x{}^2$$

$$D = 2\sigma_x\sigma_y\ \rho\bar{Y} - 2\sigma_y{}^2\bar{X} = -\ (B\bar{Y} + 2A\bar{X})$$

$$E = 2\sigma_x\sigma_y\ \rho\bar{X} - 2\sigma_x{}^2\bar{Y} = -\ (B\bar{X} + 2C\bar{Y})$$

$$F = A\bar{X}^2 + C\bar{Y}^2 + B\bar{X}\bar{Y} - AC\ (1 - \rho^2)\ \lambda_e{}^2 \quad ,$$

and

$$\lambda_e = \sqrt{2}\ \sqrt{-\ \ln\ (1 - \rho)} \quad .$$

For graphical presentations, the range of the variable is important in order to arrange the scale. The largest and smallest values of X and Y for a given probability ellipse, p, are given by

$$X_{L,S} = \bar{X} \pm \sigma_x\lambda_e \tag{14}$$

$$Y_{L,S} = \bar{Y} \pm \sigma_y\lambda_e \quad , \tag{15}$$

where, as before, $\lambda_e = \sqrt{2}\ \sqrt{-\ln\ (1 - p)}$.

Although there are several approaches to graphing the probability ellipses, the following procedure is advantageous for electronic computer plotting. In establishing the computer plotting program, the sample estimates for $\overline{X},\overline{Y}$, σ_x, σ_y, and ρ are constants in equation (13). The user makes the choice of probability ellipses desired. Thus, p in equation (12) is programmed as a parameter. The largest and smallest values for X and Y are computed by equations (14) and (15) for the largest probability ellipse selected. This sets the graphical scale. Values of X within the range of "X smallest" to "X largest" are obtained by incrementing X between these limits. Using the quadratic equation, a solution for Y of equation (13) is made and plotted for each value of X. The centroid $(\overline{X},\overline{Y})$ for the family of probability ellipses is plotted as a point. Labeling and other identification complete the plotting program.

For a given probability, equation (13) defines an ellipse that contains p-percent of the points X,Y. Since the entire area under the bivariate normal density function [equation (9)] is unity, upon integration for a given probability ellipse, that given ellipse contains p-percent of the total area. In the wind statistics, p-percent of the wind vectors fall within the specified probability ellipse. From this point of view, a specified probability ellipse gives the joint probability that p-percent of the U-V components lie within the given ellipse.

When $\sigma_x^2 = \sigma_y^2 = \sigma^2$ and $\rho = 0$ in the bivariate normal distribution, the probability ellipses of equation (13) reduce to circles whose centers are at the means $\overline{X},\overline{Y}$. The radii of the probability circles are $\sigma_{V1}\lambda_c$, where

$$\sigma_{V1} = \sqrt{2\sigma^2} \tag{16}$$

and

$$\lambda_c = \sqrt{-\ln\ (1 - p)} \quad . \tag{17}$$

Values for λ_c for selected probabilities, p, are given in table C.

Because this function is simple, it can easily be graphed manually. However, the generalized plotting technique for electronic computer plotters, as represented by equation (13), can be advantageously used.

C.3. Derived Distributions for Wind Statistics

In this subsection the probability distribution functions and sets of equations are presented to derive certain probability distribution functions for wind statistics. These derived probability distributions are:

1) The conditional distribution of wind components

2) The generalized Rayleigh distribution for windspeed

3) The distribution for wind direction

4) The conditional distribution of windspeed given a wind direction (wind rose).

The required five statistical parameters for these derived distributions for wind statistics are given in table I.

C.3.1 The Conditional Distribution of Wind Components

Given that two random variables X and Y are bivariate normally distributed, the conditional distribution $f(Y|X)$ is read as $f(Y)$ given X, and likewise $f(X|Y)$ is read as $f(X)$ given Y. The conditional probability distribution function $F(Y|X)$ has the mean $E(Y|X)$ and variance $\sigma^2_{(x|y)}$, where

$$E(Y|X^*) = \overline{Y} + \rho\left(\frac{\sigma_y}{\sigma_x}\right)(X^* - \overline{X}) \tag{18}$$

and

$$\sigma^2_{(y|x^*)} = \sigma_y^{\,2}\,(1 - \rho^2) \quad . \tag{19}$$

The conditional standard deviation is

$$\sigma_{(y|x^*)} = \sigma_y \sqrt{1 - \rho^2} \quad . \tag{20}$$

By interchanging the variables and parameters, the conditional distribution function for $F(X|Y^*)$ has the conditional mean

$$E(X|Y^*) = \overline{X} + \rho\left(\frac{\sigma_x}{\sigma_y}\right)(Y^* - \overline{Y}) \quad , \tag{21}$$

conditional variance

$$\sigma^2_{(x|y^*)} = \sigma_x^{\ 2}(1 - \rho^2) \quad , \tag{22}$$

and conditional standard deviation

$$\sigma_{(x|y^*)} = \sigma_x \sqrt{1 - \rho^2} \quad . \tag{23}$$

The preceding conditional probability distribution functions are univariate normal distributions for a (fixed) given value for one of the bivariate normal variables. Thus, the t-values given in table B are applicable for conditional probability statements. For example,

$$F(Y|X^*) = E(Y|X^*) + t\sigma_{(y|x^*)} \quad . \tag{24}$$

For $t = 1.6449$ there is a 95 percent chance that Y is less than or equal to $\overline{Y} + 1.6449\ \sigma_{(y|x^*)}$ given that $X = X^*$. In symbols this statement reads

$$P\left\{ Y \leq E(Y|X^*) + 1.6449\ \sigma_{(y|x^*)}\ \middle|\ X = X^* \right\} = 0.9500 \quad . \tag{25}$$

Interval probability statements can also be made; namely,

$$P\left\{ Y_1 = E(Y|X^*) - t\sigma_{(y|x^*)} \leqq Y \leqq Y_2 = E(Y|X^*) + t\sigma_y\ \middle|\ X = X^* \right\}$$

where X^* can take on any fixed value of X, but a convenient arrangement is to let $X^* = \overline{X} \pm t\sigma_x$.

The close connection of the regression function of Y on X to the conditional mean for the bivariate normal distribution is noted; namely,

$$Y = \bar{Y} + \rho\left(\frac{\sigma_y}{\sigma_x}\right)(X - \bar{X}) \quad . \tag{26}$$

Similarly, the regression function of X on Y is

$$X = \bar{X} + \rho\left(\frac{\sigma_y}{\sigma_x}\right)(Y - \bar{Y}) \quad . \tag{27}$$

These are linear functions and express the same results as would be obtained from a least-squares r.gression line.

C.3.2. The Generalized Rayleigh Distribution for Windspeed

If two random variables, X and Y, are bivariate normally distributed, then the probability distribution for the modulus, R, can be derived in terms of the five parameters that define the bivariate normal distribution.

$$R = \sqrt{X^2 + Y^2} \tag{28}$$

The distribution of R so derived is called a generalized Rayleigh distribution because there are no restrictions on the parameters. For applications to the RRA, the variable R is recognized as windspeed or the modulus of the wind vector.

The probability density function for R is expressed as

$$f(R) = a_0 R e^{-a_1 R^2}\left[I_0(a_2 R^2)\, I_0(a_3 R) + 2\sum_{k=1}^{\infty} I_k(a_2 R^2)\, I_{2K}(a_3 R)\cos 2k\psi \right] R \geq 0 \quad . \tag{29}$$

The functions $I_0(\cdot)$, $I_k(\cdot)$, and $I_{2k}(\cdot)$ are the modified Bessel functions of the first kind for zero order, kth order, and 2kth order. The coefficients are

$$a_0 = \exp\left[\frac{1}{2}\left\{\frac{X^2}{\sigma_a^2} + \frac{Y^2}{\sigma_b^2}\right\}\right] \Big/ \sigma_a \sigma_b \quad ,$$

where σ_a^2 and σ_b^2 are the rotated variances to produce zero correlation between X and Y. σ_a and σ_b are the positive and negative roots[1] of the expression

$$\sigma^2_{(+,-)} = \frac{1}{2}\left\{\sigma_x^2 + \sigma_y^2 \pm \left[(\sigma_x^2 + \sigma_y^2)^2 - 4\sigma_x^2\sigma_y^2(1 - \rho^2)\right]^{1/2}\right\} \quad ,$$

$$a_1 = (\sigma_x^2 + \sigma_y^2)/4(1 - \rho^2)\ \sigma_x^2\sigma_y^2 \quad ,$$

$$a_2 = \frac{\left[(\sigma_x^2 - \sigma_y^2)^2 + 4\rho^2\sigma_x^2\sigma_y^2\right]^{1/2}}{4(1 - \rho^2)\ \sigma_x^2\sigma_y^2} \quad ,$$

$$a_3 = \left[\left(\frac{\bar{X}}{\sigma_a^2}\right)^2 + \left(\frac{\bar{Y}}{\sigma_b^2}\right)^2\right]^{1/2} \quad ,$$

1. *This computational form is obtained from the determinant*

$$\begin{vmatrix} \sigma_x^2 - K & \sigma_x\sigma_y\rho \\ \sigma_x\sigma_y\rho & \sigma_y^2 - K \end{vmatrix} \quad ,$$

where K *is* $\sigma^2_{(+,-)}$, *and* σ_a *and* σ_b *are analogous to the standard deviation of the major and minor axes of the bivariate normal probability ellipse.*

and

$$\tan \psi = \frac{\bar{Y}}{\bar{X}} \frac{\sigma_a^2}{\sigma_b^2} \quad .$$

Since this density function cannot be integrated in closed form from zero to R, numerical integration is used to obtain practical results for the probability distribution function; i.e.,

$$F(R) = \int_0^{R*} f(R)\, dR \quad . \tag{30}$$

A number of special cases can be obtained from the general Rayleigh distribution [equation (29)], the simplest of which is to let $\sigma_x \equiv \sigma_y = \sigma$ and $\bar{X} = \bar{Y} = 0$ with independent variables X and Y. This gives

$$f(R) = \frac{R}{\sigma^2} e^{-R^2/2\sigma^2} \quad , \tag{31}$$

which is recognized as the classical Rayleigh probability density function. The density function, equation (31), can be integrated in closed form over any range of the variable R. Hence, the probability distribution function, F(R), for equation (31) is

$$F(R) = 1 - \exp \left\{ \frac{-R^2}{2\sigma^2} \right\} \quad . \tag{32}$$

C.3.3. The Derived Distribution of Wind Direction

Considering the wind as a vector quantity and bivariate normally distributed, the wind direction can be derived. This is done by first writing the bivariate normal probability density function in polar coordinates whose variables are

$$g(r,\theta) = rd_1 e^{-\frac{1}{2}(a^2r^2 - 2br + c^2)} \quad , \tag{33}$$

(see footnote 2)

where

$$a^2 = \frac{1}{(1-\rho^2)}\left[\frac{\sin^2\theta}{\sigma_x^2} - \frac{2\rho\cos\theta\sin\theta}{\sigma_x\sigma_y} + \frac{\cos^2\theta}{\sigma_y^2}\right] \quad ,$$

$$b = \frac{-1}{(1-\rho^2)}\left[\frac{\bar{x}\sin\theta}{\sigma_x^2} - \frac{\rho(\bar{x}\cos\theta + \bar{y}\sin\theta)}{\sigma_x\sigma_y} + \frac{\bar{y}\cos\theta}{\sigma_y^2}\right] \quad ,$$

$$c^2 = \frac{1}{(1-\rho^2)}\left[\frac{\bar{x}^2}{\sigma_x^2} - \frac{2\rho\bar{x}\bar{y}}{\sigma_x\sigma_y} + \frac{\bar{y}^2}{\sigma_y^2}\right] \quad ,$$

$$d_1 = \frac{1}{2\pi\sigma_x\sigma_y\sqrt{1-\rho^2}} \quad ,$$

$r = \sqrt{x^2 + y^2}$ is the modulus of the vector or speed, and θ is the direction of the vector. After integrating $g(r,\theta)$ over $r = 0$ to ∞, the probability density function of θ is

$$g(\theta) = \frac{d_1}{a^2} e^{-\frac{1}{2}c^2}\left[1 + \sqrt{2\pi}\left(\frac{b}{a}\right) e^{\frac{1}{2}\left(\frac{b}{a}\right)^2} \Phi\left(\frac{b}{a}\right)\right] \quad , \tag{34}$$

2. *This expression, equation (33), in Smith 1976) is given with respect to the mathematical convention for a vector direction.*

where a^2, b, c^2, and d_1 are as previously defined in equation (33) and

$$\Phi\left(\frac{b}{a}\right) = \Phi\ (x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{-\frac{1}{2}t^2}\, dt$$

is taken from tables of normal distribution functions or made available through a computer subroutine.

If desired, equation (34) can be integrated numerically over a chosen range of θ to obtain the probability that the vector direction will lie within the chosen range; i.e.,

$$F(\theta) = \int_{\theta_2}^{\theta_1} g(\theta)\, d\theta \quad . \tag{35}$$

One application may be to obtain the probability that the wind will flow from a given quadrant or sector as, for example, onshore.

C.3.4. The Derived Conditional Distribution of Windspeed Given the Wind Direction (Wind Rose)

Continuing with the considerations in section C.3.3. of this chapter, the conditional probability density function (pdf) for windspeed, r, given a specified value for the wind direction, θ, can be expressed as

$$f(r|\theta) = \frac{a^2\ r\ e^{-\frac{1}{2}(a^2\ r^2\ -\ br)}}{1 + \sqrt{2\pi}\left(\frac{b}{a}\right) e^{\frac{1}{2}\left(\frac{b}{a}\right)^2} \Phi\left\{\frac{b}{a}\right\}} \quad , \tag{36}$$

where the coefficients, $\underline{a}$ and $\underline{b}$ and the function $\Phi\left\{\frac{b}{a}\right\}$ are as previously defined in equation (33) and in equation (34).

From equation (36) the mode (most frequent value) of the conditional windspeed given a specified value of the wind direction is the positive solution of the quadratic equation,

$$a^2\ r^2 - br - 1 = 0 \quad , \tag{37}$$

which is

$$(\tilde{r}\,|\,\theta) = \frac{1}{2a}\left[\left(\frac{b}{a}\right) + \sqrt{4 + \left(\frac{b}{a}\right)^2}\,\right] \quad . \tag{38}$$

The locus of the conditional modal values of windspeed when plotted in polar form versus the given wind directions forms an ellipse.

The noncentral moment for equation (36) is expressed as

$$\mu_n' = \int_0^\infty r^n\, f(r\,|\,\theta)\, dr \quad . \tag{39}$$

Now the first noncentral moment is identical to the first central moment or the expected value, E $(r|\theta)$. The integration of equation (39) for the first moment is sufficiently simple to yield practical computations and can be expressed as

$$E(r\,|\,\theta) = \frac{\left(\frac{b}{a}\right) + \left[1 + \left(\frac{b}{a}\right)^2\right]\sqrt{2\pi}\; e^{\frac{1}{2}\left(\frac{b}{a}\right)^2}\; \Phi\left\{\frac{b}{a}\right\}}{a\left[1 + \left(\frac{b}{a}\right)\sqrt{2\pi}\; e^{\frac{1}{2}\left(\frac{b}{a}\right)^2}\; \Phi\left\{\frac{b}{a}\right\}\right]} \quad . \tag{40}$$

Hence, equation (40) gives the conditional mean value of the windspeed given a specified value for the wind direction.

The integration of equation (36) for the limits r = 0 to r = r* gives the probability that the conditional windspeed is $\leq$ r* given a value for the wind direction, θ. This conditional probability distribution (PDF) can be written as

$$\Pr\left\{r \leq r^* \mid \theta = \theta_o\right\} = 1 - \left[\frac{e^{-\frac{1}{2}r_s^2} + \sqrt{2\pi}\left(\frac{b}{a}\right)\left\{1 - \Phi\,(r_s)\right\}}{e^{-\frac{1}{2}\left(\frac{b}{a}\right)^2} + \sqrt{2\pi}\left(\frac{b}{a}\right)\Phi\left\{\frac{b}{a}\right\}}\right], \tag{41}$$

where $r_s = \left[a\, r^* - \left(\frac{b}{a}\right)\right]$.

By definition, equation (41) is an expression for a "wind rose." Empirical wind rose statistics are often tabulated or graphically illustrated giving the frequency that the windspeed is not exceeded for those windspeed values that lie within assigned class intervals of the wind direction. After evaluation of equation (41) for various values of windspeed, r*, and the given wind directions, θ, interpolations can be performed to obtain various percentile values of the conditional windspeed.

For the special case when $\underline{b}$ in equation (33) equals zero (i.e., for $\bar{x} = \bar{y} = 0$), the conditional modal values of windspeeds [equation (38)], the conditional mean values of windspeeds [equation (40)], and the fixed conditional percentile values of windspeeds [interpolated from evaluations of equation (41)], when plotted in polar form versus the given wind directions, produce a family of ellipses.

For the special case when $\bar{x} = \bar{y} = 0$, equation (36) reduces to the following simple case:

$$Pr\left\{ r \leq r^* \mid \theta = \theta_0 \right\} = 1 - e^{-\frac{a^2 r^{*2}}{2}} \quad . \tag{42}$$

There is a special significance of equation (42) when related to the bivariate normal probability distribution. If r* and θ are measured from the centroid of the probability ellipse, then the probability that $r \leq r^*$ is the same as the given probability ellipse. Further, solving equation (42) for r*, gives

$$r^* = \frac{1}{a} \sqrt{-2 \ln (1 - P)} \quad . \tag{43}$$

If a probability ellipse P is chosen, equation (42) gives the distance of r along any θ from the centroid of the ellipse to the intercept of the specified probability ellipse. If there is an interest in conditional probability of winds for a given θ relative to the monthly means, equation (43) is applicable. If it is desired to find the magnitude of the wind along any θ relative to the monthly mean to the intercept of a given probability ellipse, equation (43) is applicable.

D. Statistical Parameters With Respect To Any Orthogonal Axes

The five wind statistical parameters presented in table I are given with respect to the standard meteorological coordinate system; i.e., these parameters are for the U and V components. For many aerospace vehicles and range applications, there is a need for wind statistics with respect to orthogonal axes other than west to east and south to north. For example, it may be required to present wind statistics with respect to a flight azimuth of an

aerospace vehicle whose flight azimuth is α degrees from true north measured in a clockwise direction. The following sets of equations are presented to compute the five parameters for the new coordinate axes rotated α degrees clockwise from true north.

a. Rotation of the means through α degrees:

$$\bar{X}_\alpha = \bar{X} \cos (90 - \alpha) + \bar{Y} \sin (90 - \alpha) \tag{44}$$

$$\bar{Y}_\alpha = \bar{Y} \cos (90 - \alpha) - \bar{X} \sin (90 - \alpha) \quad . \tag{45}$$

b. Rotation of the variances through α degrees:

$$\sigma_{x_\alpha}{}^2 = \sigma_x{}^2 \cos^2 (90 - \alpha) + \sigma_y{}^2 \sin^2 (90 - \alpha)$$

$$+ 2\rho\sigma_x\sigma_y \cos (90 - \alpha) \sin (90 - \alpha) \tag{46}$$

$$\sigma_{y_\alpha}{}^2 = \sigma_y{}^2 \cos^2 (90 - \alpha) + \sigma_x{}^2 \sin^2 (90 - \alpha)$$

$$- 2\rho\sigma_x\sigma_y \cos (90 - \alpha) \sin (90 - \alpha) \quad . \tag{47}$$

c. Rotation of the linear correlation coefficient through α degrees:

$$\rho_\alpha = \frac{\operatorname{cov} (X,Y)_\alpha}{\sigma_{x_\alpha} \sigma_{y_\alpha}} \quad , \tag{48}$$

where $\operatorname{cov} (X,Y)_\alpha$ is the rotated covariance,

$$\operatorname{cov} (X,Y)_\alpha = \operatorname{cov} (X,Y) [\cos^2 (90 - \alpha) - \sin^2 (90 - \alpha)]$$

$$+ \cos (90 - \alpha) \sin (90 - \alpha) (\sigma_y{}^2 - \sigma_x{}^2)$$

and

$$\operatorname{cov}(X,Y) = \rho\sigma_x\sigma_y \quad .$$

By using these rotational equations, the bivariate normal distribution with respect to any desired rotated coordinates can be obtained from sample estimates that have been computed with respect to a specific axis. The marginal distributions after rotation are also normally (univariate) distributed. Using the rotational equations greatly reduces computational efforts for applications requiring statistics with respect to several coordinate axes.

Appendix A presents some illustrative examples for the wind statistics of the specific RRA.

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CHAPTER III. STATISTICS OF THERMODYNAMICS QUANTITIES AND MODELS

A. General Considerations

A.1. Objectives

The objective inherent in developing the thermodynamic section of the RRA was to describe the thermodynamic characteristics of the atmosphere using a minimum of data tabulations. A set of parameters was selected which, together, thermodynamically describe the climatological state of the atmosphere. These parameters are the pressure, temperature, density, dewpoint, virtual temperature, and water vapor pressure. Used together, these parameters permit the calculation of a large number of derived quantities. (Symbols used in the calculations in this chapter are summarized in table D.) Some of these quantities, such as the speed of sound, are dealt with in section III.E.

The probability distribution of each of the six thermodynamic RRA parameters is described by its mean value, its standard deviation, and its skewness. Several of these parameters (temperature, pressure, dewpoint and density) have probability distributions that are close to a univariate normal distribution; the others do not. The skewness parameter gives an estimate of the asymmetrical departures of a probability distribution.

Hydrostatically modeled mean values of pressure and density were calculated (table IV), so that users may determine the departure of the actual climatological values of these parameters from hydrostatic conditions. This was done by hydrostatically integrating the pressure from the lowest RRA data level to the termination altitude of the particular RRA.

A.2. Data Quality Control

Data limits derived from the following parameters were used to screen the thermodynamic portion of the RRA data base: temperature, pressure, dewpoint (for the 0- to 30-km portion only), and density (for the 30- to 70-km portion only). These limits were set to plus and minus six standard deviations from the mean values of each of these quantities. These limits were used to screen the thermodynamic portion of the RRA data base, according to the procedures described in section I.C. The data base used to generate the thermodynamic portion of the RRA (tables I, II, and IV) was considered to be free from errors under the following conditions:

a) The skewness values of the pressure and temperature were between -2.5 and 2.5 at all data levels.

b) The skewness values of the density were between -3.5 and 3.5 at data levels between 0 and 30 km.

c) The skewness values of the density were between -3.0 and 3.0 at data levels between 30 and 70 km.

d) The skewness values of the dewpoint were between -2.5 and 2.5 at all data levels with more than 10 data values.

TABLE D. LIST OF SYMBOLS USED IN CHAPTER III

C_s		Speed of sound
C_d	-	Collision diameter
E	-	Vapor pressure
g_ϕ	-	Gravity at latitude ϕ
H	-	Geopotential height
H_m	-	Geopotential height at a mandatory radiosonde data level
H_s		Geopotential height at a significant radiosonde data level
K_t	-	Coefficient of thermal conductivity
L	-	Mean free path length
M	-	Mean molecular weight of air at sea level
M3Q	-	Annual or monthly third moment of quantity Q
n	-	Refractive modulus
N	-	Refractive index
NA		Avogadro's constant
N_Q	-	Number of values of quantity Q
P	-	Pressure
P_m	-	Pressure at a mandatory radiosonde data level
P_s	-	Pressure at a significant radiosonde data level
P_h	-	Hydrostatically integrated mean monthly or annual pressure
Q	-	Any tabulated RRA quantity
R*	-	Universal gas constant
R'	-	Specific gas constant of dry air
r', r*	-	Parameters used in converting z to h and vice versa

TABLE D. (concluded)

S - Sutherland's constant, used in the calculation of dynamic viscosity

T - Temperature

T_d - Dew point

T_v - Virtual temperature

T_{vm} - Virtual temperature at a mandatory radiosonde data level

T_{vs} - Virtual temperature at a significant radiosonde data level

V - Mean air particle speed

V_c - Mean collision frequency

w - Parameter used in the hydrostatic interpolation of pressure and density

Z - Geometric altitude

λ - Wavelength

α_Q - Skewness of quantity Q

β - Constant used in the equation for viscosity

γ - Ratio of specific heat at constant pressure to specific heat at constant volume

ν - Kinematic coefficient of viscosity

μ - Dynamic coefficient of viscosity

ρ - Density

ρ_h - Mean monthly or annual density derived from pressure height

σ_Q - Standard deviation of the quantity Q

A.3. Limitation of Thermodynamic Statistics

The correlation coefficients between the thermodynamic quantities and the moisture-related quantities were not calculated at discrete altitudes, nor were any of the correlations between altitudes. Therefore, valid statistical dispersion models that require the relationship between two or more of these quantities at the same altitude or between altitudes cannot be derived. Approximations for the correlation coefficients between pressure, virtual temperature, and density at discrete altitudes may be obtained from the coefficients of variation as developed by Buell (1970). The coefficient of variation is the standard deviation divided by the mean. The mean values and the standard deviations are taken from table II. A model for the profile of monthly and annual mean pressure, virtual temperature, and density that is in excellent agreement with the respective statistical mean values is given by table IV. This agreement results because the physical relationships, given by the hydrostatic equation and the equation of state, were used to derive table IV. When only the monthly or annual mean values for pressure, virtual temperature, and density are required, it is recommended that table IV be used.

B. Establishing Data Samples at the Required Altitude Levels

This section describes the computational procedures used to establish data samples of the thermodynamic RRA parameters at the RRA data levels. References are cited only when an equation given is one of many available in the literature or when an equation is stated in an unusual form.

B.1. Conversion of Data Recorded in Geopotential Heights to Geometric Altitude

The upper air rocketsonde observations used to obtain the table values above 30 km were recorded in terms of geometric altitude and can be interpolated directly to the altitude intervals shown in the tables. However, the radiosonde observations used to obtain the tabular values below 30 km were recorded in terms of geopotential heights. The change of coordinates from geopotential heights to geometric altitudes (h to z) is accomplished by calculating a table of geopotential heights that correspond exactly to the geometric altitudes at which the atmospheric parameters are tabulated. The radiosonde observations are then interpolated to these geopotential heights. The relationship used to calculate geometric altitude from geopotential height is

$$H = (r'z)/(r^*z) \quad , \qquad (49)$$

where

$$r' = gr^*/9.80665$$

and

$$r^* = -2g_\phi/(\partial g_\phi/\partial z_o) \quad .$$

g_ϕ is the sea-level gravity at the latitude ϕ corresponding to the proper location. This value is given by (List, 1968)

$$g_\phi = 9.780356\ (1 + 5.2885 \times 10^{-3} \sin^2\phi - 5.9 \times 10^{-6} \sin^2 (2\phi)). \tag{50}$$

$\frac{\partial g_\phi}{\partial z_0}$ is the rate of change of gravity at the sea level. This quantity is given by the equation

$$\frac{\partial g_\phi}{\partial z_0} = -3.085462 \times 10^{-6} + 2.27 \times 10^{-9} \cos (2\phi) - 2 \times 10^{-12} \cos (4\phi). \tag{51}$$

The units used for gravity are meters per square second, while the units for $\frac{\partial g_\phi}{\partial z_0}$ are per square second.

The resulting table of values of H obtained by using even increments of 2 in equation (49) is shown in table IV of the RRA. The values of H above 30 km are not used in the interpolation of original data, but are included for the convenience of the user.

B.2. Calculations on the Original Rawinsonde Data Records

It was necessary to interpolate the information from the original rawinsonde data records to the geometric altitudes specified as the RRA data levels. The parameters for which this interpolation was required were the temperature, dewpoint, and pressure. The other parameters were calculated from the interpolated values at each RRA data level. These "derived" parameters were the water vapor pressure, density, and virtual temperature.

B.2.1. Calculation of the Geopotential Height at Significant Levels

Two somewhat different interpolation procedures were used to obtain data from radiosonde and rocketsonde observations at the levels shown in the tables. The procedure used to interpolate radiosonde observations began with the calculation of virtual temperature at each data level in a sounding. The virtual temperature was computed by

$$T_V = T/(1. - 0.379\ (e/p)) \quad , \tag{52}$$

where T_V and T are in degrees Kelvin and e and p are in millibars.

The radiosonde soundings contain a mix of data taken at "mandatory" and "significant" levels. Pressure, temperature, and dewpoint information was given in the soundings at both types of levels. However, geopotential height information was only given at the mandatory levels. The heights at the significant levels were "filled in" (calculated) hydrostatically using pressure and temperature data from these levels. This procedure permitted the use of most of the significant level data in the calculation of the RRA tables. The equation used for this process was

$$H_s = H_m + 29.2712617 \; \frac{(T_{vs} - T_{vm})}{2} \; \ln(P_s/P_m) \;, \tag{53}$$

where the subscripts s and m denote quantities at significant and mandatory levels. This equation was not used if the difference between two adjacent mandatory levels was greater than 200 mb. All soundings with such data gaps were rejected for use in compiling the RRA.

B.2.2. Temperature

Radiosonde temperatures were interpolated logarithmically with respect to pressure using the equation

$$T = T_U + (T_L - T_U) \frac{\ln p - \ln p_L}{\ln p_U - \ln p_L} \;, \tag{54}$$

where the subscripts U and L indicate values at the nearest data levels in the actual sounding above and below the interpolated level.

B.2.3. Pressure

The pressure values in each radiosonde sounding were interpolated to the RRA data levels using the equation

$$p = p_L \; \exp\left(\frac{H_L - H_U}{29.2712617\;(0.5)\;(T_{v_U} + T_{v_L})}\right) \tag{55}$$

where the subscript L indicates virtual temperature, geopotential height, and pressure values at the data level below and closest to the level at which data were required.

B.2.4. Dewpoint Temperature

Dewpoint values were interpolated logarithmically with respect to pressure using the equation

$$T_d = T_{dU} + (T_{dL} - T_{dU}) \left(\frac{\ln p - \ln p_L}{\ln p_U - \ln p_L}\right) \;. \tag{56}$$

The subscripts U and L indicate data at the nearest upper and lower data levels in a sounding.

B.2.5. Derived Water Vapor Pressure

The water vapor pressure was calculated from the interpolated dewpoint values at the RRA data levels using Teten's approximation:

$$e = 6.11 \text{ mb} \times 10^{7.5(T_d - 273.15)/(T_d - 35.86)} \quad . \tag{57}$$

B.2.6. Derived Density

The density values derived from radiosonde observations were calculated at the RRA data levels using the equation

$$\rho = 348.36787 \, p/T_v \quad . \tag{58}$$

B.2.7. Derived Virtual Temperature

The virtual temperature values were calculated at the RRA data levels for each sounding using the equation

$$T_v = T/(1 - 0.379(e/p)) \quad , \tag{59}$$

where T_v and T are in degrees Kelvin, and p and e are the pressure and vapor pressure, respectively, in millibars.

B.3. Calculations on the Original Rocketsonde Data Records

The rocketsonde data records used to calculate the RRA table values above 30 km were given in terms of geometric altitude. For this reason, slightly different calculations were required to convert the recorded data values to values at the RRA data levels. The pressure, temperature, and density were all interpolated to the RRA data levels; moisture-related parameters (virtual temperature, water vapor pressure, and dewpoint) were not calculated, since atmospheric moisture at altitudes above 30 km was considered to be negligible.

No interpolation was done across gaps in the pressure or temperature data within a sounding larger than 7,000 m. Data values at the RRA levels within such a gap were set to missing.

B.3.1. Temperature

Rocketsonde temperatures were interpolated linearly with respect to geometric altitude using the equation

$$T = T_U + (T_L - T_U)\,\frac{Z - Z_L}{Z_U - Z_L}\ , \tag{60}$$

where the subscripts U and L indicate values at the nearest data level in the actual sounding above and below the interpolated level.

B.3.2. Pressure

The pressure values in each rocketsonde sounding were interpolated to the RRA data levels using the equation

$$P = P_L \exp\left(-\frac{g_\phi}{R^*}\,\frac{M(Z - Z_L)}{\overline{T}v} \cdot W^2\right)\ , \tag{61}$$

where $\overline{T}_v = \dfrac{Tv_U + Tv_L}{2}$ and $W = \dfrac{r^*}{\left(r^* + Z + \dfrac{Z - Z_L}{2}\right)}$.

B.3.3. Density

Rocketsonde density values were interpolated using the equation

$$\rho = \rho_L \exp\left(-\frac{g_\phi M}{R^*}\,\frac{(Z - Z_L)}{\overline{T}_v} \cdot W^2\right)\ , \tag{62}$$

where W is specified in section III.B.3.2.

C. Computation of Statistical Parameters for Tables II and III

A three-step procedure was used for computing the monthly and annual means, standard deviations, and skewness values from the data values at the RRA data levels. Initially, certain statistical sums were calculated and stored as the soundings in the data base were processed. These sums were then used to calculate the monthly statistics given in the RRA tables. The annual statistics were then calculated from these stored sums and the monthly statistics.

C.1. Stored Statistical Sums

The sums calculated were

$$\sum' Q,\ \sum' Q^2,\ \text{and}\ \sum' Q^3 \quad ,$$

where Q is any one of the quantities given in the thermodynamic part of the RRA.

C.2. Calculation of the Monthly Statistics

C.2.1. Monthly Means

The mean monthly values of the thermodynamic RRA quantities were calculated using the equation

$$\bar{Q} = \sum Q/N_Q \quad ,$$

where N_Q is the number of observed values of the quantity Q for a given month.

C.2.2. Monthly Standard Deviations

The monthly standard deviations of the thermodynamic RRA quantities were calculated using the equation

$$\sigma_Q = \sqrt{\frac{(N_Q \Sigma' Q^2) - (\Sigma Q)^2}{N_Q \cdot (N_Q - 1)}} \quad . \tag{63}$$

C.2.3. Monthly Skewness Values

The monthly skewness values of the windspeed and of the thermodynamic RRA quantities were calculated using the equation

$$\alpha_Q = \frac{M3_Q}{\sigma_Q^3} \quad ,$$

where $M3_Q$ is the third moment of the quantity Q, σ_Q is its standard deviation, and

$$M_{3Q} = \left[\frac{\Sigma_Q^{\ 3}}{N_Q} - \frac{3\Sigma_Q \Sigma_Q^{\ 2}}{N^2_Q} - \frac{2\Sigma_Q^{\ 3}}{N^3_Q} \right] \cdot \frac{N_Q^{\ 2}}{(N_Q - 1)\ (N_Q - 2)} \quad . \tag{64}$$

C.3. Calculation of the Annual Statistics

Equations (63) and (64), used to calculate the monthly values of the standard deviations and skewness values, involve taking the differences between two pairs of large sums containing Q^2 and Q^3, where Q is any thermodynamic RRA quantity. Using these equations to compute the annual statistics would have resulted in a substantial loss of precision, as these sums become larger by several orders of magnitude in such a case. This problem was avoided by calculating the annual means, standard deviations, and skewness values from the monthly statistics.

C.3.1 Annual Mean Values

The annual mean values of the thermodynamic RRA quantities were calculated using the equation

$$Q_{ANN} = Q_A / N_Q \quad ,$$

where Q_A is the total of all observed values of Q and N_Q is the total number of observations of Q.

C.3.2. Annual Standard Deviations

The annual standard deviations of the thermodynamic RRA quantities were calculated using the equation

$$\sigma Q_{ANN} = \sqrt{\frac{1}{N_Q} \sum_{i=1}^{12} (N_{Qi}\, \sigma_{Qi}^{\,2}) + \frac{1}{N_Q} \sum_{i=1}^{12} (N_{Qi}\, \bar{Q}_i^{\,2}) - Q_{ANN}^{\,2}} \quad , \tag{65}$$

where N_{Qi} = the number of data values for Q in month i (i = 1 to 12), $\bar{Q}_i$ = the monthly mean of Q, and σ_{Qi} = the standard deviation of quantity Q in month i.

C.3.3. Annual Skewness Values

The annual skewness values of the thermodynamic RRA quantities were calculated using the equation

$$M3Q_{ANN} = \frac{1}{N} \sum_{i=1}^{12} (N_{Qi}\, M_{3Qi}) + \frac{3}{NQ_{ANN}} \sum_{i=1}^{12} (N_{Qi}\, \bar{Q}_i\, \sigma_{Qi}^{\;2})$$

$$+ \frac{1}{NQ_{ANN}} \sum_{i=1}^{12} (N_{Qi}\, Q_i^{\;3}) - \frac{3\bar{Q}_{ANN}}{NQ_{ANN}} \sum_{i=1}^{12} (N_{Qi}\, Q_i^{\;2})$$

$$- \frac{3\bar{Q}_{ANN}}{NQ_{ANN}} \sum_{i=1}^{12} (N_{Qi}\, \sigma_{Qi}^{\;2}) + 2\bar{Q}_{ANN}^{\;\;3} \quad , \qquad (66)$$

where M_{3Qi} = the third moment about the mean of quantity Q in month i and $M3Q_{ANN}$ = the annual third moment about the mean of the quantity Q.

D. Derived Monthly Mean and Annual Mean Model Atmospheres

A set of modeled monthly mean and annual mean hydrostatic values of pressure and density was calculated from the lowest RRA data level (0 km, mean sea level) upwards to 30 km, and from 30 km upwards to 70 km. The integration from 0 to 30 km was computed independently of the integration from 30 to 70 km because of the difference in data sources. The two different values for 30 km are provided for comparison. When 30-km data are required, the values given in the 0- to 30-km table should be used. These hydrostatically modeled mean values, which are given in table IV, are useful as a check on the validity of the pressure and density values given in table II. In most cases, the values in tables II and IV for any given data level are within 1 percent of each other. The hydrostatic pressure values in table IV were calculated using the equation

$$p_1 = p_0 \exp\left(- \frac{0.034162\ (H_1 - H_0)}{0.5\ (T_{v_1} + T_{v_0})} \right) . \qquad (67)$$

where $H_1 - H_0$ is in meters and a "0" subscript refers to values at the RRA data level immediately below the level being checked. p_0 at the lowest data level is set equal to the RRA mean pressure; p_1, calculated for the next highest data level, is taken as p_0 for the level above that. This process is repeated for all the other RRA data levels. The hydrostatic density corresponding to the hydrostatic pressures is calculated from these pressures and the RRA virtual temperature values using the formula

$$\rho_H = 348.36786\ P_H/T_v \quad , \qquad (68)$$

where ρ_H and P_H are the hydrostatic density and pressure shown in table IV of the RRA.

E. Thermodynamic Quantities Derivable from the Basic Tables

Several other quantities can be calculated from the statistics listed in tables I and II. Primary physical constants used in these calculations are listed in table E. The equations given in this section can be used to calculate the approximate mean values of these quantities at each RRA data level. It is not possible to infer or derive any information concerning the standard deviation or skewness values of these quantities from the data in tables II and III of the RRA.

E.1. Mean Air Particle Speed

The mean air particle speed, V, is the arithmetic average of the speeds of all air particles in the volume element being considered. For a valid average to occur, there must be a sufficient number of particles involved to represent mean conditions. The equation for V for dry air is

$$V = \sqrt{\frac{8}{\pi} \cdot \frac{R^*T}{M}} \quad . \tag{69}$$

A computational form for dry air, using tabulated values, is

$$V = \sqrt{7.3094 \times 10^2 \times T} \text{ (meters per second)} \quad , \tag{70}$$

where T is the temperature in degrees Kelvin from table II. Equation (69), when corrected for moist air, becomes

$$V = \sqrt{\frac{8}{\pi} \cdot R' \, T_V} \quad . \tag{71}$$

The computational form for moist air is

$$V = \sqrt{7.3094 \cdot 10^2 \cdot \overline{T_V}} \text{ (meters per second)} \quad , \tag{72}$$

where T_V is the virtual temperature in degrees Kelvin from table III.

TABLE E. LIST OF PRIMARY PHYSICAL CONSTANTS

P_o = standard atmospheric pressure at sea level
= 1.013250×10^5 Newton/m^2 = 2116.22 lb/ft^2

ρ_o = standard atmospheric density at sea level
= 1.2250 kg/m^3 = 0.076474 lb/ft^3

T_o = standard temperature at sea level = 288.15 K = 15.0°C = 59.0°F

g_o = standard gravity at sea level at latitude 45°32'33"
= 9.80665 m/s^2

s = Sutherland's constant used in calculation of dynamic viscosity
= 110.4 K

T_I = ice-point temperature at P_o = 273.15 K

β = constant used in calculation of dynamic viscosity
= 1.458×10^{-6} kg/s m K$^{\frac{1}{2}}$
= 7.3025×10^{-7} lb/s ft R$^{\frac{1}{2}}$

γ = ratio of specific heat of air at constant pressure to specific heat of air at constant volume
= 1.4

C_D = mean effective co ion diameter of air molecules
= 3.65×10^{-10} m = 1.1975×10^{-9} ft

N_a = Avogadro's constant
= 6.022169×10^{26}/kg mol = 2.73179×10^{26}/lb mol

R* = gas constant = 8.31432 J/mol K

R' = gas constant for dry air = 2.8704×10^2 J/kg K

M = molecular weight of dry air = 28.966 g/mol

E.2. Mean Free Path

The mean free path, L, is the mean value of the distance traveled by each neutral air particle in a selected air parcel, between successive collisions with other particles in that parcel. A meaningful average requires that the selected parcel be large enough to contain a substantial number of particles. The equation for L is given by

$$L = \left(\frac{\sqrt{2}}{2\pi}\right)\left(\frac{R^*T}{N_a\ C_d^{\ 2}\ P}\right) \quad , \tag{73}$$

where C_d is the effective collision diameter of the mean air molecules. The 1976 standard atmosphere value of 3.65×10^{-10} is valid for the range of altitudes in the RRA.

A computational form for moist air, using tabulated values, is

$$L = 2.335 \times 10^{-7}\ \frac{T}{P}\ \text{(meters)} \quad , \tag{74}$$

where T is the temperature in degrees Kelvin from table II and P is the pressure in millibars from table II.

A form of (73) to correct L for moist air is

$$L = \left(\frac{\sqrt{2}}{2\pi}\right)\frac{R'MT_v}{N_a\ C_d^{\ 2}} \quad . \tag{75}$$

The computational form for moist air is

$$L = 2.3325 \times 10^{-7}\ \frac{T_v}{P}\ \text{(meters)} \quad , \tag{76}$$

where T_v is the virtual temperature in degrees Kelvin from table III and P is the pressure in millibars from table II.

E.3. Mean Collision Frequency

The mean collision frequency, V_c, is considered to be the average speed of air particles contained in an air parcel, divided by the mean free path of the particles inside that parcel. Computationally this is equivalent to

$$V_c = \frac{V}{L}\ (\mathrm{sec}^{-1}) \quad . \tag{77}$$

To determine V_c for dry air, use V and L from equations (70) and (74). To determine V_c for moist air, use V and L from equations (72) and (76).

E.4. Speed of Sound

The expression for the speed of sound, C_s, in meters per second in dry air, is

$$C_s = \sqrt{\frac{\gamma R^* T}{M}} \quad . \tag{78}$$

To compute C_s for dry air from tabulated values, use

$$C_s = \sqrt{4.0185 \times 10^2 \times T} \quad \text{(meters per second)} \quad , \tag{79}$$

where T is the temperature in degrees Kelvin from table II. One form for the speed of sound in moist air is

$$C_s = \sqrt{\gamma R' T_v} \quad , \tag{80}$$

where T_v is the virtual temperature from table III. A computational form for moist air is

$$C_s = \sqrt{4.0185 \times 10^2\ T_v} \quad \text{(meters per second)} \quad . \tag{81}$$

E.5. Dynamic Coefficient of Viscosity

The coefficient of dynamic viscosity, μ, is defined as a coefficient of internal friction developed where gas regions move adjacent to each other at different velocities. The following expression is taken from the U.S. Standard Atmosphere (1976):

$$\mu = \frac{\beta \cdot T^{3/2}}{T + S} \quad . \tag{82}$$

The computational form is

$$\mu = \frac{(1.458 \times 10^{-6})\, T^{3/2}}{T + 110.4} \quad \text{(kilograms per second per meter)} \quad , \tag{83}$$

where T is the temperature in degrees Kelvin from table II.

E.6. Kinematic Coefficient of Viscosity

The kinematic coefficient of viscosity, designated as η, is defined to be the ratio of the dynamic coefficient of viscosity of a gas to its density, or

$$\eta = \mu/\rho \quad . \tag{84}$$

The computational form is

$$\eta = 1.0 \times 10^{3}\, \mu/\rho \quad \text{(square meters per second)} \quad , \tag{85}$$

where μ is the dynamic coefficient of viscosity from equation (83) and ρ is the density in grams per cubic meter from table II.

E.7. Coefficient of Thermal Conductivity

The empirical expression used for the coefficient of thermal conductivity, designated as K_t, is given in the 1976 Standard Atmosphere as

$$K_t = \frac{2.65019 \times 10^{-3} \cdot T^{3/2}}{T + 245.4 \times 10^{-(12/T)}} \quad \text{(watts per meter per degree Kelvin)} \quad , \tag{86}$$

where T is in degrees Kelvin.

E.8. Refractive Modulus and Refractive Index

The refractive modulus or refractivity (Selby and McClatchey, 1975; Smith and Weintraub, 1953) is defined as N, where

$$N = (n - 1) \cdot 10^{6} \tag{87}$$

and n is the refractive index.

For microwave frequencies below approximately 30 GHz (equivalent to wavelengths above 1 cm), N, the refractive modulus, is given by the empirical equation

$$N = 77.6 \frac{P}{T_d} + 3.73 \times 10^5 \frac{e}{T^2} \text{ (dimensionless)}, \tag{88}$$

where E and P are in millibars and T and T_d are in degrees Kelvin.

The following expression is valid for the visible and infrared wavelengths shorter than approximately 30 μm (0.03 mm).

$$N = 77.6 \frac{P}{T} + 0.584 \frac{P}{T\lambda} \text{ (dimensionless)}, \tag{89}$$

where λ is the wavelength in microns and T is in degrees Kelvin.

The expression for N for the wavelength from 0.03 mm to 1 cm is an extremely complex function of wavelength.

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CHAPTER IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This document satisfies the technical objectives established for the RRAC by the RCC MG. Upper air statistics and models for wind and thermodynamic quantities for the specific site have been derived in a consistent and uniform manner, which will be used in publications for all other assigned site locations. These RRAs represent an improvement over the previously published RRAs because of the availability of more extensive upper air data bases and the adaptation of more advanced statistical techniques. A statistical measure of central tendency (mean values) and a measure of dispersion (standard deviation with respect to the mean values) for monthly and annual reference periods have been tabulated for all variables in a consistent manner from data bases that have been edited and quality-controlled in the same manner. Further, a statistical measure for symmetry (skewness coefficient that involves the third statistical moment) has been tabulated for all variables except the U and V wind components. Even with these improvements, the user of these RRAs must recognize certain limitations of the statistical tabulations:

1) The wind profile structure with respect to altitude cannot be modeled from the RRA statistics because the interlevel and crosslevel correlations were not computed.

2) The profile structure with respect to altitude for any of the thermodynamic variables or any quantities derivable from these variables cannot be modeled because the prerequisite correlations were not computed. However, the profiles of monthly and annual means for pressure, virtual temperature, and density are in agreement (table IV) with the hydrostatic equation and the equation of state.

The preceding limitations are cited to prevent a misuse of the RRAs. More extensive statistical tabulations were beyond the scope of this committee's task. As greater insight is gained through usage of these RRAs, many adaptations of the statistical tabulations for specific engineering and scientific applications are envisioned.

Recommendations

It is recommended than the wind and thermodynamic statistical tabulations and attendant models contained in the RRAs be used as a standard reference source, as may be appropriate, by the ranges and range users. It is further recommended that the respective Range Staff Meteorologist or responsible agency staff member be consulted for the applicability of the RRAs for specific engineering applications.

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In addition to the documents above and the present RRA for Eglin AFB, Florida, the revised series will include RRAs for the following locations:

Point Mugu, California
Taquac (Guam)
Barking Sands, Hawaii
Ascension Island, South Atlantic

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CONVERSION UNITS

Physical Constants and Conversion Factors

Numerical values in this document are given in the International System of Units (SI, Système International d'Unités). The values in parentheses are equivalent U.S. Customary Units, which are English units adapted for use by the United States of America. The SI and U.S. Customary Units provided in table F are those normally used for measuring and reporting atmospheric data.

By definition, the following fundamental conversion factors are exact:

Type	U.S. Customary Units	Metric
Length	1 U.S. yard (yd)	0.9144 meter (m)
Mass	1 avoirdupois pound (lb)	453.59237 gram (g)
Time	1 second (s)	1 second (s)
Temperature	1 degree Rankine (°R)	9/5 degree Kelvin (K)

To aid in the conversion of units, conversion factors based on the above fundamental conversion factors are given in table F.

TABLE F. FACTORS FOR CONVERSION UNITS

Type of Data	METRIC Unit	METRIC Abbreviation	U.S. CUSTOMARY Unit	U.S. CUSTOMARY Abbreviation	CONVERSION Multiply	CONVERSION By	CONVERSION To Get
TEMPERATURE							
Ambient Temperature	degree Celsius	°C	degree Fahrenheit	°F	°F - 32	0.5556	°C
	degree Kelvin	K	degree Rankine	°R	°C	1.8*	°F - 32
					°R	1.00*	°F + 459.67
					°R - 459.67	1.00*	°F
					K	1.00*	°C + 273.15
					K - 273.15	1.00*	°C
Temperature Change	degree Celsius	°C	degree Fahrenheit	°F	°C or K	1.8*	temp change °F or °R
	degree Kelvin	K	degree Rankine	°R	°F or °R	0.5556	temp change °C or K
DENSITY							
Water Vapor Vapor Concentration (Absolute Humidity) and Ambient Density	gram per cubic meter	$g\ m^{-3}$	grain per cubic foot	$gr\ ft^{-3}$	$g\ m^{-3}$	0.43700	$gr\ ft^{-3}$
	gram per cubic centimeter	$g\ cm^{-3}$			$gr\ ft^{-3}$	2.2883	$g\ m^{-3}$
					$g\ m^{-3}$	10^{-6}*	$g\ cm^{-3}$
					$g\ cm^{-3}$	4.370×10^{5}	$gr\ ft^{-3}$
					$gr\ ft^{-3}$	2.288×10^{-6}	$g\ cm^{-3}$
WIND							
Windspeed	meter per second	$m\ s^{-1}$	mile per hour	mph	$m\ s^{-1}$	2.2369	mph
			knots	knots	mph	0.44704*	$m\ s^{-1}$
			feet per second	$ft\ s^{-1}$	$m\ s^{-1}$	1.9438	knots
					knots	0.51444	$m\ s^{-1}$
					mph	0.868976	knots
					knots	1.15078	mph
					$m\ s^{-1}$	3.2808	$ft\ s^{-1}$
					$ft\ s^{-1}$	0.3048*	$m\ s^{-1}$
DISTANCE							
Length	meter	m	feet	ft	m	3.2808	ft
	micron	μ	inch	in.	ft	0.3048*	m
	Angstrom unit	Å			in.	$2.54 \times 10^{+4}$*	μ
					in.	$2.54 \times 10^{+8}$*	Å
					m	10^{+6}*	μ
					m	10^{+10}*	Å

* Defined exact conversion factor

TABLE F. (continued)

Type of Data	METRIC Unit	METRIC Abbreviation	U.S. CUSTOMARY Unit	U.S. CUSTOMARY Abbreviation	CONVERSION Multiply	CONVERSION By	CONVERSION To Get
DISTANCE (Concluded)					μ	10^{-6}*	m
					μ	3.937×10^{-5}	in
					Å	10^{-10}*	m
					Å	3.937×10^{-9}	in.
MASS							
Weight	gram	g	grain	gr	lb	0.45359237*	kg
	kilogram	kg	pound	lb	lb	453.59237*	g
					kg	2.20462	lb
					g	15.4324	gr
					gr	0.06480	g
PRESSURE							
Atmospheric	newton per square meter	newton m^{-2}	pound force per square inch	lb $in.^{-2}$	mb	10^{-3}*	bar
					bar	10^{3}*	mb
	millimeter of Mercury	mmHg	inch of Mercury	in Hg	newton m^{-2}	10^{-2}*	mb
					newton m^{-2}	1.4504×10^{-4}	lb $in.^{-2}$
					lb in^{-2}	6.8948×10^{3}	newton m^{-2}
	bar	bar			mb	1.4504×10^{-2}	lb $in.^{-2}$
	millibar	mb			lb $in.^{-2}$	68.948	mb
	dyne per square centimeter (microbar)	dyne cm^{-2}			mb	10^{3}*	dyne cm^{-2}
					dyne cm^{-2}	10^{-3}*	mb
	kilogram force per square meter	kg m^{-2}			lb in^{-2}	6.8948×10^{4}	dyne cm^{-2}
					dyne cm^{-2}	1.4504×10^{-5}	lb in^{-2}
					mb	10.1972	kg m^{-2}
					kg m^{-2}	0.0980665	mb
					lb in^{-2}	703.0696	kg m^{-2}
					kg m^{-2}	0.0014223	lb in^{-2}
					mb	2.9530×10^{-2}	in.Hg (32°F)
					mb	0.75006	mmHg (0°C)
					in.Hg (32°F)	25.40*	mmHg (0°C)
					mmHg (0°C)	1.33322	mb
					in.Hg (32°F)	33.8639	mb
	pascal	Pa			Pa	1.00*	newton m^{-2}

* Defined exact conversion factor

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TABLE I. 1 WIND STATISTICAL PARAMETERS, JANUARY
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	-.28	2.41	-.0736	-.69	2.74	3.10	2.06	1.17	913.
1.000	3.64	5.86	.0080	.62	7.10	8.71	4.73	.72	905.
2.000	8.76	6.37	-.0114	.92	6.83	11.46	5.77	.54	903.
3.000	12.57	7.25	.0238	1.45	7.49	14.78	7.09	.45	904.
4.000	16.02	8.34	.0723	2.00	8.31	18.16	8.34	.44	910.
5.000	19.38	9.44	.1380	2.63	9.29	21.57	9.62	.42	909.
6.000	22.82	10.48	.2161	3.24	10.30	25.19	10.61	.43	910.
7.000	26.07	11.92	.2350	3.92	11.44	28.78	11.72	.41	901.
8.000	29.36	12.66	.2727	4.35	12.58	32.24	12.63	.29	888.
9.000	32.63	13.63	.2787	4.87	13.67	35.70	13.64	.37	879.
10.000	35.85	13.99	.2508	5.07	14.62	39.03	14.04	.19	854.
11.000	38.47	14.23	.2671	4.97	14.81	41.53	14.19	.28	826.
12.000	40.28	13.90	.2888	4.96	14.68	43.10	14.07	.29	804.
13.000	40.27	13.05	.2515	4.99	12.53	42.38	13.31	.42	784.
14.000	37.99	11.71	.2574	4.64	10.69	39.67	11.92	.40	763.
15.000	34.20	10.54	.2457	4.12	9.15	35.60	10.67	.48	754.
16.000	29.82	8.89	.2339	3.38	7.74	31.00	8.88	.15	742.
17.000	24.71	8.10	.1967	2.46	6.47	25.69	8.00	.14	704.
18.000	19.54	8.33	.2459	1.64	5.51	20.48	8.06	.55	698.
19.000	14.51	8.48	.3268	1.07	4.68	15.63	7.83	.99	698.
20.000	10.93	8.20	.3735	.78	4.07	12.33	7.20	1.09	671.
21.000	8.28	7.96	.4313	.40	3.78	10.14	6.60	1.13	653.
22.000	7.06	6.87	.4232	.22	3.79	9.77	6.88	1.25	643.
23.000	7.57	8.40	.4512	.44	3.39	9.70	6.51	1.31	638
24.000	7.30	9.60	.3857	.54	3.74	10.33	[illegible]	1.70	643.
25.000	7.13	9.81	[illegible]	.51	4.07	10.73	6.98	1.09	629.
26.000	7.37	10.46	.3139	.46	4.32	11.43	7.21	.94	622.
27.000	8.39	11.62	.3058	.58	4.54	12.67	8.12	.71	558.
28.000	10.04	12.94	.3008	.91	5.20	14.52	9.23	.34	539.
29.000	13.13	13.02	.3752	1.06	5.40	16.51	9.97	.54	395.
30.000	14.87	14.21	.3229	1.74	6.06	18.60	10.80	.53	398

TABLE I. 2 WIND STATISTICAL PARAMETERS, FEBRUARY
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	-.09	2.75	-.0163	-.40	2.84	3.23	2.22	1.36	869.
1.000	3.68	6.51	-.0323	.05	7.51	9.19	5.27	1.04	871.
2.000	8.68	6.76	-.0155	.42	8.03	12.10	6.25	.74	870.
3.000	12.97	7.58	.0376	1.13	8.62	15.62	7.57	.90	868.
4.000	16.84	8.31	.1229	1.69	9.40	19.26	8.53	.74	869.
5.000	20.66	9.39	.1800	2.21	10.32	23.13	9.54	.56	864.
6.000	24.51	10.66	.2208	3.09	11.22	27.11	10.72	.63	851.
7.000	28.04	11.77	.2511	3.81	12.17	30.83	11.68	.59	855.
8.000	31.73	12.86	.2386	4.22	13.09	34.66	12.65	.31	842.
9.000	35.86	14.54	.2412	4.50	13.91	38.87	14.14	.33	826.
10.000	39.52	15.27	.2499	4.60	15.02	42.68	14.83	.26	793.
11.000	42.21	15.17	.2569	4.55	15.05	45.20	14.70	.13	756.
12.000	43.99	15.30	.2174	4.58	14.23	46.54	15.06	.38	733.
13.000	42.65	13.50	.2155	4.28	12.53	44.72	13.27	.37	701.
14.000	39.33	11.07	.2911	3.58	10.45	40.83	11.17	.16	681.
15.000	35.63	10.32	.3115	3.06	9.28	36.92	10.41	.68	673.
16.000	30.77	8.64	.2297	2.30	7.59	31.79	8.58	.25	649.
17.000	25.00	7.90	.1996	1.59	6.19	25.82	7.83	.17	612.
18.000	19.63	9.04	.2046	1.14	5.50	20.65	8.49	.88	607.
19.000	14.10	9.00	.2175	.64	4.47	15.26	8.18	1.35	579.
20.000	10.55	9.58	.2299	.26	3.95	12.35	8.13	1.37	570.
21.000	8.19	10.06	.2771	.08	3.64	10.90	7.80	1.42	558.
22.000	6.38	11.09	.3403	-.20	3.66	10.63	8.01	1.85	558.
23.000	6.16	10.06	.3861	-.21	3.73	9.95	7.38	1.78	557.
24.000	6.24	11.24	.4148	-.07	4.31	10.96	7.98	1.52	562.
25.000	6.79	11.37	.4271	.23	4.26	11.22	8.22	1.43	544.
26.000	7.02	11.58	.4831	.32	4.12	11.45	8.32	1.46	529.
27.000	7.49	12.08	.5115	.33	4.29	12.18	8.48	1.37	453.
28.000	8.92	12.65	.4535	.16	4.43	13.61	9.60	.84	442.
29.000	11.74	12.81	.4235	.47	4.46	15.37	9.25	.67	303.
30.000	13.62	13.34	.3439	.65	4.41	16.90	9.88	.55	293.

TABLE I. 3 WIND STATISTICAL PARAMETERS. MARCH
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	-.06	2.66	-.0396	.30	2.95	3.37	2.12	1.04	918.
1.000	3.51	5.95	-.0366	1.48	7.53	9.06	4.94	1.00	924.
2.000	7.72	6.83	-.0444	.95	7.77	11.46	6.02	.69	925.
3.000	12.08	7.95	-.0524	.86	8.06	14.82	7.42	.64	924.
4.000	15.88	9.10	.0422	.97	8.42	18.16	8.78	.48	922.
5.000	19.55	10.26	.1456	1.15	9.05	21.63	10.13	.50	921.
6.000	22.85	10.85	.1357	1.27	9.66	24.87	10.76	[illegible]	915.
7.000	26.04	11.61	.1989	1.57	10.47	28.14	11.53	.36	913.
8.000	29.17	12.38	.1574	1.44	11.15	31.33	12.20	.23	896.
9.000	32.60	13.59	.1408	1.49	12.17	34.93	13.33	.20	889.
10.000	36.14	14.38	.1676	1.49	13.19	38.60	14.10	.04	865.
11.000	39.38	14.61	.1550	1.23	13.60	41.80	14.24	-.09	830.
12.000	41.86	14.39	.1398	1.41	13.46	44.09	14.09	.17	805.
13.000	40.89	12.52	.1311	1.11	12.05	42.67	12.40	.30	775.
14.000	38.17	11.44	.2408	1.39	10.29	39.60	11.29	.55	759.
15.000	34.12	10.08	.2584	1.36	9.04	35.35	9.98	.62	748.
16.000	29.14	8.80	.2007	.80	7.33	30.10	8.63	.33	726.
17.000	23.70	8.04	.1768	.27	6.20	24.55	7.90	.29	692.
18.000	17.88	8.30	.1578	.04	5.22	18.74	8.04	.60	694.
19.000	12.01	8.64	.1477	.05	4.49	13.34	7.82	1.28	675.
20.000	7.56	8.28	.2610	-.07	3.89	9.58	7.01	1.90	666.
21.000	4.57	7.94	.3995	-.04	3.42	7.47	6.30	2.27	661.
22.000	3.36	7.99	.3206	.06	3.51	7.19	5.98	2.43	656.
23.000	2.95	7.63	.2984	-.12	3.06	6.99	5.25	2.18	652.
24.000	2.61	8.81	.2375	-.38	3.54	7.92	5.85	1.71	647.
25.000	2.49	9.26	.1912	-.48	3.48	8.35	5.87	1.51	643.
26.000	3.05	9.82	.0949	-.62	3.21	8.72	6.35	1.80	611.
27.000	4.05	10.54	.0615	-.68	3.35	9.75	6.63	1.55	528.
28.000	5.82	11.05	.0584	-.60	3.87	11.07	6.97	1.26	501.
29.000	8.80	11.02	.1042	-.67	3.86	12.63	7.38	1.03	368.
30.000	10.79	11.89	.1235	-.50	4.02	[illegible].39	8.16	.87	304.

TABLE I. 4 WIND STATISTICAL PARAMETERS. APRIL
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	.03	2.75	-.1109	1.28	3.04	3.63	2.30	.85	871.
1.000	2.52	5.77	-.1042	2.39	6.72	8.34	4.57	1.02	885.
2.000	5.02	6.54	-.0401	1.35	6.70	9.35	5.23	1.05	887.
3.000	8.04	7.31	-.0282	.48	6.70	11.06	6.38	.79	885.
4.000	10.85	8.57	.0697	-.07	6.89	13.41	7.66	.82	887.
5.000	13.60	9.65	.1191	-.39	7.30	15.94	8.79	.72	884.
6.000	16.27	10.49	.1924	-.57	7.74	18.40	9.83	.76	879.
7.000	18.77	11.21	.2602	-.63	8.50	20.83	10.79	.79	882.
8.000	21.44	12.47	.2478	-.98	9.37	23.60	12.11	.75	879.
9.000	24.15	13.71	.2566	-1.33	10.59	26.54	13.42	.76	877.
10.000	26.86	14.78	.3020	-1.66	11.93	29.59	14.47	.74	870.
11.000	29.51	15.21	.2574	-2.37	12.79	32.48	14.70	.47	851.
12.000	32.34	15.49	.2402	-2.97	13.41	35.32	15.06	.37	841.
13.000	33.20	13.80	.2455	-2.91	12.42	35.64	13.62	.31	825.
14.000	32.06	12.16	.2936	-2.46	10.50	33.89	12.05	.60	822.
15.000	28.18	10.04	.3220	-2.07	8.84	29.68	9.81	.69	816.
16.000	23.27	8.42	.3210	-1.86	7.37	24.60	8.04	.64	793.
17.000	17.71	7.38	.2223	-1.65	6.13	19.02	6.85	.49	768
18.000	11.80	7.59	.1387	-1.43	5.11	13.53	6.47	.99	766.
19.000	6.66	6.96	.1561	-1.14	3.91	8.71	5.79	1.54	759.
20.000	3.20	6.17	.1682	-1.08	2.94	6.17	4.47	1.93	749.
21.000	.79	5.80	.2185	-1.02	2.67	5.31	3.76	2.18	731.
22.000	-.62	5.80	.2295	-.98	2.63	5.39	3.58	2.39	721.
23.000	-1.12	5.23	.2668	-.94	2.30	5.03	3.06	1.43	707.
24.000	-1.37	5.74	.2580	-.86	2.69	5.49	3.56	1.40	695.
25.000	-1.11	5.87	.3121	-.84	2.73	5.58	3.56	.98	688.
26.000	-.51	6.05	.2991	-.75	2.67	5.63	3.58	.93	657.
27.000	.31	6.31	.1855	-.69	2.96	5.99	3.61	.86	579.
28.000	1.77	6.54	.1400	-.76	3.00	6.40	3.80	1.03	542.
29.000	3.54	7.19	.0282	-.68	3.12	7.54	4.18	.75	430.
30.000	5.05	7.73	.0362	-.66	3.14	8.52	4.78	.68	421.

TABLE I. 5 WIND STATISTICAL PARAMETERS. MAY

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	.25	2.44	.0329	.70	2.85	3.22	2.07	.90	946.
1.000	.97	5.00	-.0839	.95	5.49	6.60	3.65	1.16	942.
2.000	2.03	5.65	-.0260	.37	5.57	7.16	3.98	1.27	942.
3.000	3.80	6.45	.0135	-.26	5.80	8.10	4.91	1.32	941.
4.000	5.45	7.12	.0516	-.87	5.91	9.[illegible]5	5.69	1.22	943.
5.000	7.32	7.5[illegible]	.0834	-1.31	5.18	10.48	6.37	1.00	944.
6.000	9.23	7.99	.0693	-1.65	6.63	12.07	7.07	.95	945.
7.000	11.14	8.52	.1077	-2.03	7.10	13.87	7.68	.81	945.
8.000	13.13	9.32	.1132	-2.26	7.85	15.89	8.55	.7[illegible]	941.
9.000	14.90	10.33	.1066	-2.52	8.88	17.89	9.67	.71	938.
10.000	16.92	11.48	.1200	-2.75	10.31	20.28	10.99	.[illegible]3	936.
11.000	19.04	12.37	.0908	-3.27	11.64	22.82	11.87	.67	933.
12.000	21.52	12.97	.0862	-3.66	12.30	25.33	12.41	.56	928.
13.000	23.13	12.54	.0673	-3.99	11.67	26.49	11.94	.46	921.
14.000	22.42	10.58	.0871	-3.74	10.04	24.99	10.24	.37	915.
15.000	19.38	[illegible].74	.1271	-3.30	9.21	21.45	8.37	.31	908.
16.000	15.17	7.48	.1592	-2.90	[illegible].44	16.95	6.98	.38	881.
17.000	10.56	6.49	.1819	-2.31	5.10	12.32	5.78	.59	867.
18.000	5.93	5.71	.1654	-1.82	4.33	8.22	4.72	.96	860.
19.000	1.85	4.90	.1386	-1.46	3.30	5.42	3.32	1.53	852.
20.000	-.96	4.47	.1020	-1.19	2.48	4.64	2.63	1.52	842.
21.000	-2.93	4.22	.0406	-.88	2.18	4.96	2.69	.79	833.
22.000	-4.23	4.16	.0275	-.69	2.03	5.60	2.90	.62	837.
23.000	-4.92	4.30	.0170	-.65	1.84	5.98	3.27	.58	819.
24.000	-5.34	4.66	-.0042	-.63	2.22	6.48	3.69	.61	812.
25.000	-5.33	5.00	.0269	-.57	2.21	6.60	3.88	.63	799.
26.000	-5.20	5.42	.1090	-.51	2.17	6.64	4.15	.85	754.
27.000	-4.69	5.83	.0682	-.52	2.49	6.65	4.26	.97	677.
28.000	-4.16	6.14	.0970	-.64	2.37	6.58	4.21	1.13	627.
29.000	-3.49	6.57	.0846	-.76	2.65	6.68	4.27	1.10	492.
30.000	-2.79	6.97	.1046	-.97	2.56	6.63	4.45	1.06	490.

TABLE I. 6 WIND STATISTICAL PARAMETERS. JUNE

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	.47	2.11	.3095	.51	2.41	2.74	1.80	.83	845.
1.000	.82	4.50	.0450	.59	4.04	5.26	3.15	1.82	841.
2.000	.66	4.97	.0543	-.16	4.50	5.71	3.58	2.29	842.
3.000	1.45	5.21	.0598	-.68	4.31	5.91	3.65	1.56	842.
4.000	2.26	5.55	.0837	-.93	4.32	6.36	3.87	1.39	843.
5.000	3.01	6.01	.1571	-1.00	4.50	7.01	4.17	1.26	848.
6.000	3.55	6.47	.1589	-1.05	4.97	7.78	4.43	1.17	844.
7.000	4.14	7.06	.1840	-1.27	5.42	8.60	4.90	1.08	844.
8.000	4.88	7.68	.2078	-1.45	6.14	9.61	5.49	1.10	840.
9.000	5.73	8.44	.2315	-1.65	7.40	10.86	6.59	1.39	839.
10.000	6.61	9.29	.2473	-1.71	8.45	12.20	7.46	1.33	83[illegible].
11.000	7.60	10.43	.2336	-2.08	9.44	13.73	8.44	1.30	827.
12.000	8.62	11.15	.2302	-2.93	10.02	15.02	9.05	1.23	8[illegible]9.
13.000	9.24	11.09	.2155	-3.98	10.16	15.71	8.97	1.09	817.
14.000	8.71	10.35	.2472	-4.60	9.13	14.95	7.99	.97	813.
15.000	6.64	8.88	.2373	-4.39	7.00	12.32	6.49	.86	807.
16.000	3.91	7.17	.2228	-3.64	5.38	9.10	5.10	1.05	769.
17.000	.66	5.59	.1809	-2.58	3.93	6.42	3.55	.77	780.
18.000	-2.48	4.41	.1064	-1.69	2.90	5.49	2.63	.35	778.
19.000	-4.94	3.50	.0503	-1.12	2.22	5.93	2.77	.40	77[illegible].
20.000	-6.91	3.17	.0099	-.97	1.87	7.34	2.89	.31	760.
21.000	-8.51	3.30	-.0402	-.89	2.09	8.85	3.15	.22	748.
22.000	-9.72	3.14	-.0860	-.65	2.02	9.98	3.04	.30	742.
23.000	-10.66	3.19	-.0318	-.56	1.87	10.85	3.14	.37	716.
24.000	-11.37	3.54	.0595	-.57	2.08	11.60	3.46	.07	712.
25.000	-12.00	3.95	.1045	-.46	2.03	12.19	3.94	.29	702.
26.000	-12.26	4.14	.0132	-.42	1.97	12.44	4.09	.02	665.
27.000	-12.55	4.53	-.0599	-.48	2.20	12.79	4.42	-.03	5[illegible]2.
28.000	-12.66	4.52	-.1218	-.6[illegible]	1.93	12.89	4.39	-.02	544.
29.000	-12.81	4.75	-.1171	-.61	2.53	13.13	4.57	.07	413.
30.000	-13.38	4.68	-.1253	-.72	2.15	13.61	4.55	-.01	396.

TABLE I. 7 WIND STATISTICAL PARAMETERS, JULY
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	.72	1.96	.3351	.46	2.14	2.50	1.70	.66	784.
1.000	1.62	4.11	-.0470	.70	3.32	4.85	2.72	1.14	780.
2.000	1.10	4.47	.0676	.08	3.82	5.20	2.95	1.06	780.
3.000	1.34	4.78	.1059	-.12	3.91	5.51	3.09	.87	779.
4.000	1.68	4.99	.1588	-.35	3.85	5.69	3.20	.91	779.
5.000	1.80	5.15	.1946	-.57	4.04	5.96	3.31	.90	777.
6.000	1.62	5.39	.2074	-.72	4.29	6.19	3.33	.75	778.
7.000	1.41	5.72	.2260	-.90	4.65	6.64	3.59	.68	774.
8.000	1.15	6.25	.2435	-1.13	5.13	7.22	3.99	.72	768.
9.000	.80	7.04	.2496	-1.34	5.70	8.02	4.49	.87	769.
10.000	.35	8.03	.2761	-1.65	6.37	9.03	5.13	.95	763.
11.000	-.19	9.17	.2927	-1.96	7.18	10.17	5.99	1.12	758.
12.000	-.63	9.70	.3037	-2.74	7.62	10.99	6.27	.88	749.
13.000	-1.17	10.02	.2781	-3.46	7.56	11.37	6.44	.88	748.
14.000	-2.02	9.09	.2309	-4.02	6.55	10.48	5.98	.94	742.
15.000	-2.99	7.12	.2319	-3.90	5.02	8.69	4.96	.81	734.
16.000	[illegible]	5.39	.2462	-3.15	3.63	7.25	4.15	.81	711.
17.000	-5.64	4.11	.2391	-2.16	2.80	7.05	3.39	.52	696.
18.000	-7.27	3.40	.1972	-1.25	2.49	7.88	3.15	.08	694.
19.000	-8.95	3.08	.1211	-.85	2.07	9.26	2.97	-.01	689.
20.000	-10.65	2.95	.0505	-.63	1.94	10.86	2.86	.04	682.
21.000	-12.40	3.09	-.1602	-.50	2.07	12.60	3.01	-.03	668.
22.000	-13.85	2.65	-.1831	-.43	2.05	14.02	2.61	-.08	658.
23.000	-15.12	2.53	-.0360	-.42	2.02	15.26	2.52	.01	642
24.000	-16.21	2.82	.0358	-.43	2.03	16.34	2.83	.13	637.
25.000	-17.20	3.09	.0198	-.40	1.97	17.32	3.09	.34	619.
26.000	-17.95	3.24	-.0054	-.38	1.96	18.06	3.23	.32	605.
27.000	-19.55	3.62	-.0760	-.38	2.52	18.74	3.55	.19	560.
28.000	-19.30	3.56	-.0820	-.40	2.07	19.42	3.54	.31	510.
29.000	-20.01	4.08	-.0693	-.45	2.62	20.19	4.05	.31	415.
30.000	-20.66	3.71	-.0617	-.44	2.03	20.77	3.70	.09	387.

TABLE I. 8 WIND STATISTICAL PARAMETERS, AUGUST
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	.05	4.44	-.1923	.19	2.32	2.54	4.32	23.30	826.
1.000	.32	3.85	.1190	.57	3.58	4.62	2.58	1.10	823.
2.000	.44	4.05	.2091	.37	3.97	4.98	2.78	1.25	818.
3.000	.90	4.31	.2219	.08	4.12	5.25	2.95	1.20	814.
4.000	1.32	4.35	.1962	-.02	4.28	5.43	3.09	.99	812.
5.000	1.47	4.51	.2214	-.11	4.48	5.68	3.21	.95	809.
6.000	1.47	4.79	.1874	-.21	4.80	6.04	3.43	.94	809.
7.000	1.54	5.15	.2172	-.25	5.22	6.49	3.75	1.01	807.
8.000	1.60	5.87	.2649	-.36	5.87	7.30	4.29	1.18	803.
9.000	1.74	6.74	.2994	-.45	6.66	8.22	5.04	1.37	805.
10.000	1.87	7.08	.2983	-.50	7.54	9.23	5.86	1.43	804.
11.000	2.09	8.58	.2945	-.69	8.47	10.35	6.56	1.35	795.
12.000	2.15	9.06	.2900	-.99	8.71	11.00	6.52	1.19	785.
13.000	1.89	9.11	.2898	-1.45	8.44	11.05	6.14	1.11	782.
14.000	.86	8.09	.2512	-1.99	7.12	9.76	5.06	1.02	780.
15.000	-.67	6.21	.2059	-1.78	5.35	7.49	3.82	.79	774.
16.000	-2.32	4.59	.2623	-1.34	3.84	5.85	2.92	.82	753.
17.000	-4.11	3.54	.2657	-.96	2.77	5.53	2.73	.50	739.
18.000	-6.07	3.05	.1295	-.76	2.38	6.68	2.78	.06	738.
19.000	-8.22	2.94	.0941	-.61	2.17	8.55	2.87	-.08	734.
20.000	-10.15	2.84	.1023	-.48	1.67	10.35	2.78	.08	727.
21.000	-11.95	2.82	-.0326	-.41	2.00	12.12	2.81	.13	715.
22.000	-13.48	2.62	-.1035	-.45	1.90	13.62	2.61	.45	705.
23.000	-14.91	2.49	.0313	-.40	1.91	15.03	2.51	.10	683.
24.000	-15.26	2.78	.0449	-.30	1.97	16.38	2.78	.15	680.
25.000	-17.17	2.97	.0412	-.25	1.93	17.29	2.95	.11	668.
26.000	-17.73	3.04	.0187	-.40	1.95	17.84	3.04	.22	636.
27.000	-18.37	3.50	.0616	-.60	2.39	18.53	3.52	.44	586.
28.000	-19.04	3.19	-.0241	-.69	2.04	19.17	3.19	.19	535.
29.000	-19.76	3.79	-.0767	-.79	2.66	19.96	3.79	.22	446.
30.000	-20.43	3.56	-.1152	-.81	2.09	20.55	3.56	.33	410.

TABLE 1. 9 WIND STATISTICAL PARAMETERS, SEPTEMBER
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	-.72	2.41	.1164	-.40	2.43	2.88	2.02	1.79	803.
1.000	-2.29	4.96	-.1535	.73	4.68	6.16	3.78	1.61	799.
2.000	-1.28	5.33	-.0234	.67	4.88	6.31	3.81	1.76	796.
3.000	.07	5.52	.0447	.47	4.89	6.25	3.93	1.62	792.
4.000	1.06	5.65	.0659	.39	5.01	6.41	4.15	1.87	795.
5.000	1.65	6.00	.1011	.33	5.07	6.81	4.34	1.84	794.
6.000	2.53	6.55	.1442	.25	5.28	7.50	4.56	1.55	793.
7.000	3.34	7.26	.1788	.18	5.73	8.40	5.11	1.52	795.
8.000	4.32	8.08	.2421	.19	6.40	9.52	5.84	1.27	792.
9.000	5.45	9.05	.2953	.31	7.34	10.93	6.78	1.10	788.
10.000	6.49	10.09	.3128	.14	8.60	12.59	7.70	.97	788.
11.000	7.57	10.29	.2920	-.32	9.69	14.13	8.35	.97	784.
12.000	8.66	11.33	.2596	-.86	10.30	15.28	8.82	.95	762.
13.000	9.04	11.37	.2252	-1.63	9.95	15.43	8.63	.98	758.
14.000	8.09	10.28	.2423	-2.26	8.50	13.96	7.32	.67	753.
15.000	5.72	8.47	.2787	-2.27	6.58	10.95	5.74	.78	752.
16.000	3.07	6.80	.2913	-1.84	4.81	9.00	4.26	.77	729.
17.000	.46	5.51	.2547	-1.28	3.43	5.87	3.07	.59	709.
18.000	-1.80	4.73	.2206	-.91	2.69	5.14	2.59	.66	705.
19.000	-3.77	3.98	.1287	-.68	2.14	5.26	2.72	.48	706.
20.000	-5.53	3.61	.0869	-.65	1.91	6.21	3.02	.34	698.
21.000	-7.10	3.63	.0001	-.57	1.95	7.57	3.25	.30	681.
22.000	-8.29	3.45	-.0041	-.47	1.74	8.56	3.28	.15	678.
23.000	-9.30	3.46	.0280	-.51	1.67	9.50	3.36	.04	665.
24.000	-10.17	3.79	.0510	-.54	2.04	10.44	3.63	.27	657.
25.000	-10.86	4.02	.0571	-.38	2.03	11.10	3.90	.30	644.
26.000	-11.11	4.07	.0865	-.20	1.94	11.31	4.00	-.03	611.
27.000	-11.30	4.42	.1286	-.20	2.30	11.58	4.28	.10	555.
28.000	-11.06	4.34	.0738	-.65	1.94	11.29	4.24	.01	528.
29.000	-11.15	4.66	.0217	-.94	2.47	11.50	4.55	-.03	410.
30.000	-10.76	4.88	.0532	-.95	1.98	11.06	4.71	-.03	385.

TABLE 1. 10 WIND STATISTICAL PARAMETERS, OCTOBER
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	-.30	1.91	.1248	-.96	2.15	2.57	1.63	1.35	813.
1.000	-1.53	4.76	-.1208	-1.13	4.98	6.31	3.34	1.17	812.
2.000	.26	5.40	-.0064	-1.09	5.12	6.51	3.77	1.08	811.
3.000	2.17	5.88	.0477	-1.06	5.22	6.90	4.48	1.28	805.
4.000	4.35	6.12	.0746	-.96	5.58	7.88	5.13	1.23	806.
5.000	6.34	6.82	.0939	-.92	6.37	9.59	6.00	1.26	802.
6.000	8.22	7.51	.1626	-1.02	7.03	11.41	6.65	1.17	795.
7.000	10.35	8.27	.2115	-1.15	7.85	13.47	7.53	1.14	792.
8.000	12.44	9.19	.2413	-1.27	8.97	15.85	8.34	1.08	783.
9.000	14.86	10.19	.2648	-1.28	10.42	18.75	9.12	.88	778.
10.000	17.51	11.14	.2838	-1.29	11.89	21.84	9.81	.74	776.
11.000	19.90	12.07	.2775	-1.47	13.00	24.62	10.32	.59	767.
12.000	21.49	12.33	.2818	-1.60	13.50	26.22	10.54	.39	758.
13.000	21.86	12.16	.2721	-1.63	13.05	26.17	10.65	.41	755.
14.000	20.24	11.09	.3054	-1.67	11.06	23.80	9.56	.38	751.
15.000	17.13	9.62	.3041	-1.39	8.47	19.83	8.14	.37	742.
16.000	13.05	7.70	.2544	-1.19	6.44	15.15	6.55	.47	724.
17.000	8.80	6.19	.2291	-.88	4.78	10.58	5.23	.65	704.
18.000	4.83	5.48	.2307	-.54	3.66	7.05	4.14	1.11	699.
19.000	2.14	5.13	.2300	-.23	2.76	5.26	3.29	1.47	695.
20.000	.45	4.78	.2091	-.33	2.41	4.57	2.84	1.51	681.
21.000	-.63	4.85	.1995	-.52	2.31	4.66	2.79	1.43	667.
22.000	-1.27	4.75	.2132	-.47	2.35	4.74	2.73	1.04	661.
23.000	-1.47	4.77	.2309	-.45	2.11	4.73	2.67	.75	653.
24.000	-1.46	5.18	.2256	-.51	2.50	5.20	2.60	.84	654.
25.000	-1.23	5.39	.1594	-.47	2.35	5.27	2.93	.85	650.
26.000	-.71	5.78	.1504	-.45	2.34	5.49	3.06	.90	626.
27.000	-.17	6.36	.1452	-.50	2.65	6.01	3.39	.98	555.
28.000	1.17	6.86	.1509	-.59	2.63	6.41	3.82	1.18	520.
29.000	2.01	7.41	.1235	-.61	3.02	7.02	4.36	1.31	391.
30.000	3.52	7.97	.1459	-.78	3.05	7.53	5.24	1.30	384.

TABLE I. 11 WIND STATISTICAL PARAMETERS, NOVEMBER
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	-.27	2.26	-.0917	-.82	2.44	2.84	1.93	1.59	755.
1.000	1.43	5.76	-.0906	-.22	6.48	7.71	4.23	.82	741.
2.000	5.02	6.63	-.0350	-.13	6.57	9.15	5.34	1.17	740.
3.000	8.11	7.53	-.0079	-.42	6.87	11.17	6.72	.93	739.
4.000	10.98	8.33	.0357	-.32	7.39	13.49	7.90	.81	741.
5.000	13.62	9.18	.0662	-.16	8.31	16.14	8.85	.80	745.
6.000	16.28	9.90	.1072	-.05	9.13	18.84	9.57	.66	745.
7.000	19.23	10.83	.14[illegible]8	.05	10.03	21.92	10.36	.61	744.
8.000	22.18	11.73	.1874	.14	11.02	25.04	11.13	.50	738.
9.000	25.11	12.74	.1956	.13	12.16	28.20	12.05	.51	734.
10.000	27.92	13.37	.2425	.16	13.26	31.22	12.63	.39	722
11.000	30.68	13.79	.2459	-.05	14.14	34.06	13.08	.25	709.
12.000	32.90	14.28	.2539	.01	14.62	36.19	13.78	.48	704.
13.000	32.88	13.35	.2453	.04	13.55	35.66	13.09	.73	699.
14.000	30.46	11.06	.2492	.21	11.01	32.45	10.85	.43	692.
15.000	26.56	9.42	.2154	.00	8.97	28.11	9.17	.31	689.
16.000	22.20	8.10	.2063	-.28	7.73	23.56	7.95	.38	662.
17.000	17.45	7.21	.1833	-.56	6.49	18.71	6.97	.44	650.
18.000	12.79	7.17	.2427	-.75	5.29	14.06	6.76	1.05	637.
19.000	9.11	6.33	.2696	-.64	4.17	10.35	5.79	1.44	626.
20.000	7.20	6.23	.2549	-.35	3.73	8.69	5.40	1.67	621.
21.000	6.28	6.09	.2760	-.13	3.25	7.84	5.07	1.50	609.
22.000	6.11	6.62	.2492	-.04	3.26	8.02	5.23	1.27	608.
23.000	6.99	6.35	.2939	.04	2.90	8.40	5.19	1.15	597.
24.000	8.26	7.03	.2559	.18	3.35	9.77	5.79	1.02	595.
25.000	9.88	7.26	.2649	.37	3.32	11.15	6.09	.74	587.
26.000	11.56	7.51	.3366	.63	3.27	12.60	6.50	.74	567.
27.000	13.45	7.99	.3244	.78	3.51	14.50	6.88	.22	515.
28.000	15.83	8.46	.2742	.95	3.82	16.80	7.44	.10	508.
29.000	17.94	9.25	.3049	1.08	4.09	18.64	8.39	.01	394.
30.000	20.79	9.72	.3172	1.30	4.40	21.47	9.32	-.17	388.

TABLE I. 12 WIND STATISTICAL PARAMETERS, DECEMBER
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.020	-.70	4.70	.5997	-.83	4.88	3.28	6.02	21.28	773.
1.000	2.09	5.84	-.0097	.75	7.78	8.90	4.92	.73	772.
2.000	7.43	6.55	.0140	.72	7.81	11.19	5.84	.60	775.
3.000	11.24	7.42	.0199	1.03	8.02	14.07	6.93	.59	775.
4.000	14.50	8.06	.0561	1.34	8.77	17.07	7.90	.62	774.
5.000	17.36	8.98	.0982	1.68	9.72	20.00	8.90	.62	776.
6.000	20.46	9.76	.1514	2.32	10.60	23.15	9.77	.55	771.
7.000	23.48	10.81	.1851	2.87	11.52	26.32	10.77	.68	769.
8.000	26.48	11.52	.1897	3.26	12.29	29.48	11.24	.42	767.
9.000	29.64	12.99	.2167	3.66	13.29	32.84	12.59	.41	767.
10.000	32.33	13.76	.2232	3.84	14.16	35.69	13.27	.39	754.
11.000	34.82	14.32	.2256	3.56	14.42	38.10	13.62	.36	739.
12.000	36.78	14.64	.2039	3.45	14.[illegible]2	39.87	14.14	.56	726.
13.000	39.75	13.40	.2251	3.55	13.25	39.38	12.92	.60	710.
14.000	34.56	11.76	.2466	3.34	11.28	36.63	11.37	.29	695.
15.000	31.69	10.76	.2537	2.79	9.65	33.27	10.70	.44	685.
16.000	27.49	8.99	.2662	2.24	8.52	28.89	8.92	.34	668.
17.000	22.52	8.02	.2434	1.71	7.08	23.72	7.86	.27	638.
18.000	17.47	8.04	.2513	1.15	6.08	18.72	7.60	.68	631.
19.000	12.66	7.68	.2301	.63	4.91	13.95	7.00	.86	616.
20.000	9.97	7.54	.3099	.44	4.07	11.19	6.91	1.05	609.
21.000	8.74	7.42	.3331	.25	3.55	9.95	6.71	1.25	603.
22.000	8.48	7.82	.3599	.[illegible]7	3.53	9.93	5.84	1.52	583.
23.000	9.14	7.00	.3419	.11	3.09	10.09	6.33	1.03	574.
24.000	10.00	8.17	.2673	.26	3.58	11.36	7.13	1.18	569.
25.000	11.59	6.84	.2545	.38	3.88	13.08	7.53	.94	560.
26.000	13.61	9.23	.2408	.53	4.09	14.83	8.22	.72	560.
27.000	15.38	9.51	.2004	.78	4.48	16.58	8.51	.59	510.
28.000	17.50	10.50	.1450	1.33	5.17	19.01	9.13	.62	501.
29.000	20.10	11.62	.1158	1.85	5.38	21.93	9.51	.54	381.
30.000	22.51	12.68	.0907	2.67	5.72	24.56	10.19	.33	377.

TABLE 1. 13 WIND STATISTICAL PARAMETERS, ANNUAL
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN U M/S	S.D. U M/S	R(U,V)	MEAN V M/S	S.D. V M/S	MEAN WS M/S	S.D. WS M/S	SKEW WS	NOBS
.000	-.07	2.88	.1414	-.03	2.93	3.01	2.79	23.77	10116.
1.000	1.52	5.63	-.0251	.65	6.06	7.18	4.42	1.24	10095.
2.000	3.91	6.87	.0217	.39	6.20	8.45	5.44	1.20	10092.
3.000	6.36	8.19	.0679	.26	6.45	10.05	6.94	1.16	10069.
4.000	8.59	9.48	.1291	.25	6.88	11.84	8.42	1.08	10080.
5.000	10.69	10.88	.1808	.31	7.52	13.83	9.90	1.02	10073.
6.000	12.71	12.28	.2270	.42	8.19	15.90	11.26	.96	10045.
7.000	14.71	13.71	.2593	.52	8.99	18.06	12.62	.91	10022.
8.000	16.72	15.17	2646	.51	9.83	20.33	13.89	.79	9941.
9.000	18.84	16.86	.2684	.52	10.85	22.81	15.38	.77	9888.
10.000	20.79	18.23	.2710	.44	11.90	25.21	16.52	.68	9761.
11.000	22.55	19.39	.2592	.10	12.56	27.36	17.16	.57	9555.
12.000	24.06	20.11	.2601	-.21	12.82	28.95	17.60	.56	9414.
13.000	23.98	19.44	.2727	-.56	11.95	28.65	16.59	.49	9275.
14.000	22.28	18.00	3205	-.78	10.28	26.48	15.03	.44	9156.
15.000	19.35	16.37	.3438	-.78	8.52	23.02	13.63	.50	9081.
16.000	15.65	14.55	.3703	-.73	6.91	19.08	11.89	.49	8828.
17.000	11.41	12.84	.2873	-.63	5.51	15.08	9.92	.67	8559.
18.000	7.28	11.63	.2505	-.51	4.54	11.90	8.21	1.20	8505.
19.000	3.48	10.34	.2334	-.42	3.63	9.48	6.52	1.72	8369.
20.000	.85	9.69	.2410	-.40	3.06	8.51	5.65	1.76	8276.
21.000	-1.01	9.53	.2337	-.39	2.81	8.42	5.39	1.41	8127.
22.000	-2.15	9.83	.2176	-.36	2.77	8.66	5.54	1.35	8050.
23.000	-2.53	10.14	.2287	-.33	2.55	9.21	5.56	.92	7903.
24.000	-2.79	11.08	.2204	-.30	2.92	10.09	6.10	.93	7864.
25.000	-2.75	11.78	.2162	-.23	2.95	10.68	6.41	.74	7733.
26.000	-2.34	12.56	.2226	-.18	2.96	11.22	6.78	.74	7443.
27.000	-1.90	13.51	.2201	-.16	3.24	12.04	7.19	.66	6658.
28.000	-.75	14.64	.2415	-.15	3.46	12.94	7.72	.67	6297.
29.000	.06	15.96	.2522	-.13	3.71	14.11	8.34	.68	4844.
30.000	1.40	17.19	.2872	.00	3.86	15.13	9.12	.69	4683.

TABLE II.1 THERMODYNAMIC STATISTICAL PARAMETERS, JANUARY

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1019.9000	5.6802	-.10	283.39	6.84	-.45	1250.0000	36.7700	.51	807.	807.	807.
.020	1017.8000	5.7945	-.14	283.05	6.76	-.41	1249.0000	36.3900	.45	930.	930.	930.
1.000	904.7400	4.6916	-.43	281.87	5.47	-.81	1115.0000	23.8700	.70	932.	932.	932.
2.000	801.4600	4.6544	-.62	279.00	4.09	-.96	998.6000	13.8800	.75	931.	931.	931.
3.000	708.8000	4.8739	-.73	274.67	3.74	-1.13	897.5000	9.9070	.92	931.	931.	931.
4.000	625.3500	5.0547	-.82	269.36	3.56	-.72	807.7000	7.5870	.14	931.	931.	931.
5.000	550.4100	5.1924	-.90	263.39	3.64	-.73	727.2000	6.6500	.06	931.	931.	931.
6.000	482.9100	5.2259	-.89	256.82	3.65	-.81	654.4000	5.9170	.76	929.	929.	929.
7.000	422.1600	5.1973	-.84	250.04	3.67	-.64	587.7000	5.3300	-.14	927.	927.	927.
8.000	367.7500	5.1245	-.80	242.78	3.76	-.53	527.3000	5.3900	-.15	923.	923.	923.
9.000	318.9400	4.9735	-.71	235.36	3.59	-.32	471.9000	5.3960	-1.10	920.	920.	920.
10.000	275.3600	4.7270	-.58	228.04	3.27	-.20	420.6000	5.9710	-1.71	915.	915.	915.
11.000	236.7000	4.2921	-.42	221.59	3.10	.26	372.2000	7.2760	-1.42	910.	910.	910.
12.000	202.7200	3.7039	-.34	216.54	3.96	.42	326.3000	8.7540	-.77	907.	907.	907.
13.000	173.0400	3.0980	-.22	213.47	4.01	-.11	282.5000	8.1640	-.22	890.	890.	890.
14.000	147.4700	2.5535	-.16	211.11	3.00	-.12	243.4000	6.1480	-.23	885.	885.	885
15.000	125.3900	2.0547	-.10	207.90	2.73	.31	210.2000	5.2280	-.36	884.	884.	884.
16.000	106.3600	1.6433	.00	205.16	3.03	.42	180.7000	4.6590	-.28	874.	874.	874.
17.000	90.0750	1.2301	.04	203.79	3.36	.42	154.0000	4.0100	-.17	841.	841.	841.
18.000	76.2290	1.0060	-.04	203.74	3.60	.23	130.4000	3.3170	-.01	821.	821.	821.
19.000	64.5620	.8025	-.06	205.38	3.33	.13	109.6000	2.4130	.04	806.	806.	806.
20.000	54.8080	.6741	-.11	207.76	2.89	.15	91.9200	1.7110	.12	776.	776.	776.
21.000	46.6190	.5924	-.14	210.28	2.69	.34	77.2400	1.2690	.10	742.	742.	742.
22.000	39.7150	.5151	-.15	212.59	2.74	.53	65.0900	.9973	-.04	727.	727.	727.
23.000	33.8990	.4673	-.09	214.39	2.70	.43	55.0900	.8051	-.20	718.	718.	718.
24.000	28.9580	.4226	-.06	216.13	2.79	.37	46.6800	.6780	-.14	715.	715.	715.
25.000	24.7790	.3832	-.01	217.66	2.84	.26	39.6600	.5932	-.24	694.	694.	694.
26.000	21.2250	.3508	.06	219.17	2.89	.12	33.7400	.5319	-.26	686.	686.	686.
27.000	18.2010	.3145	.12	220.76	3.11	.26	28.7200	.4859	-.29	629.	629.	629.
28.000	15.6250	.2862	.18	222.48	3.70	.45	24.4700	.4668	-.34	615.	615.	615.
29.000	13.4190	.2502	.15	224.03	3.72	.45	20.8700	.3671	-.28	492.	492.	492.
30.000	11.5510	.2288	.17	225.60	3.84	.48	17.8200	.3432	-.23	485.	455.	485

TABLE II. 2 THERMODYNAMIC STATISTICAL PARAMETERS, FEBRUARY

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1018.3000	6.2567	-.24	283.76	6.37	-.33	1246.0000	34.1600	.36	744.	744.	744.
.020	1015.9000	6.0234	-.28	283.79	6.29	-.35	1243.0000	33.5300	.37	868.	868.	868.
1.000	903.0600	4.9185	-.49	281.25	5.15	-.40	1116.0000	22.7800	.33	870.	870.	870.
2.000	799.6800	4.7275	-.53	278.12	4.20	-.63	999.8000	14.7600	.42	870.	870.	870.
3.000	706.9200	4.8422	-.57	273.75	3.93	-.72	898.2000	11.1100	.36	870.	870.	870.
4.000	623.4200	5.0325	-.63	268.32	3.77	-.76	808.3000	8.6950	.28	870.	870.	870.
5.000	548.4100	5.1822	-.64	262.23	3.70	-.63	727.7000	7.3000	.08	869.	869.	869.
6.000	480.8700	5.2181	-.64	255.74	3.64	-.53	654.4000	6.3100	-.25	865.	865.	865.
7.000	420.1400	5.1633	-.61	248.95	3.69	-.41	587.4000	5.9910	-.42	862.	862.	862.
8.000	365.7900	5.0736	-.55	241.82	3.74	-.29	526.5000	5.8640	-.62	860.	860.	860.
9.000	317.0900	4.8841	-.47	234.65	3.63	-.25	470.5000	6.0630	-1.05	857.	857.	857.
10.000	273.6800	4.5846	-.36	228.02	3.58	.01	418.1000	7.0070	-1.26	854.	854.	854.
11.000	235.3000	4.1388	-.23	222.38	3.95	.57	369.7000	8.3570	-.86	853.	853.	853.
12.000	201.6300	3.5627	-.13	217.91	4.67	.11	322.6000	9.1180	-.35	844.	844.	844.
13.000	172.3300	3.0239	.08	214.97	3.99	-.39	279.4000	7.5340	-.05	829.	829.	829.
14.000	146.9700	2.5337	.19	211.97	2.89	.06	241.6000	5.6600	-.23	824.	824.	824.
15.000	125.0400	2.0573	.26	208.37	2.71	.39	209.1000	5.2260	-.07	818.	819.	818.
16.000	106.1000	1.6271	.30	205.52	2.96	.25	179.9000	4.6580	.13	816.	816.	816.
17.000	89.8930	1.2688	.31	204.16	3.31	.03	153.4000	4.0960	.33	776.	776.	776.
18.000	76.1110	.9722	.25	204.23	3.62	-.21	129.9000	3.4300	.46	755.	755.	755.
19.000	64.5270	.7570	.17	206.35	3.07	-.05	109.0000	2.3840	.35	738.	738.	738.
20.000	54.8030	.6146	.11	209.02	2.61	-.08	91.3600	1.6010	.20	709.	709.	709.
21.000	46.6490	.5320	.08	211.37	2.44	-.06	76.8900	1.1610	.09	656.	656.	656.
22.000	39.7800	.4616	.08	213.48	2.55	.04	64.9200	.9264	.02	634.	634.	634.
23.000	33.9720	.4173	.07	215.10	2.47	.07	55.0300	.7385	.01	624.	624.	624.
24.000	29.0290	.3808	.04	216.55	2.60	.17	46.7000	.6384	.05	630.	630.	630.
25.000	24.8430	.3457	.00	217.97	2.70	.14	39.7100	.5413	.04	605.	605.	605.
26.000	21.2800	.3183	-.02	219.41	2.86	.10	33.7900	.4644	.01	586.	586.	586.
27.000	18.2560	.2946	-.01	221.22	2.94	.44	28.7500	.4219	-.12	508.	508.	508.
28.000	15.6770	.2710	.00	222.94	3.33	.63	24.5000	.3942	-.14	502.	502.	502.
29.000	13.4690	.2527	.07	224.83	3.52	.53	20.8700	.3531	-.11	396.	396.	396.
30.000	11.5990	.2344	.10	226.83	3.75	.19	17.8200	.3254	-.13	392.	392.	392.

TABLE II. 3 THERMODYNAMIC STATISTICAL PARAMETERS. MARCH

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1016.9000	5.9382	-.21	287.66	5.72	-.67	1226.0000	30.5500	.69	842.	842.	842.
.020	1014.7090	5.9947	-.21	287.32	5.85	-.64	1225.0000	31.0600	.67	944.	944.	944.
1.000	903.3100	4.9171	-.38	284.36	4.91	-.90	1103.0000	21.7500	.73	945.	945.	945.
2.000	800.8200	4.6176	-.52	280.38	4.14	-.98	992.9000	14.7200	.65	947.	947.	947.
3.000	708.6300	4.6302	-.67	275.75	3.60	-.78	893.8000	10.3900	.37	947.	947.	947.
4.000	625.4500	4.6755	-.80	270.13	3.50	-.47	805.7000	8.3030	.12	947.	947.	947.
5.000	550.6500	4.7412	-.83	263.77	3.42	-.26	726.5000	7.0970	-.24	945.	945.	945.
6.000	483.2100	4.7281	-.80	257.12	3.37	-.19	654.2000	6.0940	-.35	942.	942.	942.
7.000	422.4700	4.6737	-.72	250.23	3.46	-.26	587.8000	5.5090	-.36	942.	942.	942.
8.000	368.0300	4.5945	-.64	242.99	3.53	-.29	527.4000	5.2340	-.54	937.	937.	937.
9.000	319.2400	4.4610	-.56	235.60	3.50	-.23	471.9000	5.3340	-1.20	934.	934.	934.
10.000	275.6700	4.2744	-.43	228.31	3.42	.03	420.5000	5.6990	-1.75	933.	933.	933.
11.000	237.0100	3.9560	-.29	221.93	3.29	.43	372.1000	6.5550	-1.37	926.	926.	926.
12.000	203.0500	3.4755	-.20	217.06	3.82	.34	326.0000	7.7070	-.79	923.	923.	923.
13.000	173.4100	2.9677	-.07	214.42	3.49	-.14	281.8000	7.1130	-.19	909.	909.	909.
14.000	147.8600	2.4793	-.01	211.80	2.93	-.20	243.3000	5.8200	-.10	904.	904.	904.
15.000	125.7900	2.0143	.03	208.66	2.70	.02	210.1000	4.9770	-.02	899.	899.	899.
16.000	106.7900	1.6252	.05	206.21	2.92	-.05	180.5000	[illegible]	.07	892.	892.	892.
17.000	90.5210	1.2843	.07	205.00	3.19	-.21	153.9000	3.8950	.10	850.	850.	850.
18 000	76.6920	1.0030	.12	205.20	3.43	-.19	130.2000	3.2590	.17	837.	837.	837.
19 000	65.0580	.7915	.12	207.23	3.17	-.16	109.4000	2.4500	.18	830.	830.	830.
20.000	55.2940	.6361	.07	209.97	2.93	-.01	91.7600	1.7720	.11	804.	804.	804.
21.000	47.1270	.5281	.06	212.63	2.90	-.10	77.2200	1.3600	.07	746.	746.	746.
22 000	40.2140	.4623	.05	214.88	2.87	-.19	65.2000	1.0010	-.05	739.	739.	739.
23.000	34.3890	.4230	.01	216.71	2.91	-.12	55 2900	.7818	-.16	725.	725.	725.
24.000	29.4140	.3953	-.08	218.42	3.11	-.01	46.9200	.6548	-.24	729.	729.	729.
25.000	25.2070	.3697	-.12	219.89	3.32	-.02	39.9400	.5544	-.24	719.	719.	719.
26.000	21.6200	.3530	-.15	221.43	3.54	.12	34.0200	.4643	-.17	693.	693.	693.
27.000	18.5740	.3331	-.21	223.11	3.67	.30	29.0000	.3967	-.13	608.	608.	608.
28.000	15.9750	.3146	-.18	224.91	3.77	.27	24.7500	.3539	-.10	596.	596.	596.
29.000	13.7560	.2930	-.13	226.80	3.70	.13	21.1300	.3163	-.21	470.	470.	470.
30.000	11.8630	.2811	-.10	226.99	3.61	-.07	18.0500	.2922	-.22	464.	464.	464.

TABLE II. 4 THERMODYNAMIC STATISTICAL PARAMETERS. APRIL

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1016.5000	4.8721	-.59	292.15	4.97	-.91	1205.0000	24.9700	.93	809.	809.	809.
.020	1014.2000	4.8668	-.54	291.87	5.07	-.88	1204.0000	25.3400	.89	894.	893.	893.
1.000	904.4800	4.1932	-.73	288.06	3.33	-.98	1090.0000	14.6600	.70	895.	895.	895.
2.000	803.0400	3.9046	-.79	283.41	3.34	-.54	984.6000	11.8000	.33	895.	895.	895.
3.000	711.4800	3.8476	-.81	278.47	3.24	-.38	889.5000	9.3090	.29	894.	894.	894.
4.000	628.7500	3.9540	-.76	272.58	3.05	-.37	802.5000	7.3560	.10	894.	894.	894.
5.000	554.1700	3.9930	-.73	265.95	2.90	-.42	725.1000	6.1430	.00	894.	894.	894.
6.000	486.8200	3.9982	-.64	259.27	2.84	-.54	653.5000	5.0480	-.08	892.	892.	892.
7.000	426.1300	4.0036	-.62	252.50	2.99	-.57	587.5000	4.4740	-.21	892.	892.	892.
8.000	371.7100	3.9827	-.59	245.32	3.13	-.53	527.5000	4.1680	-.43	892.	892.	892.
9.000	322.8600	3.9177	-.56	237.85	3.07	-.35	472.6000	3.9540	-.81	889.	889.	889.
10.000	279.1700	3.8089	-.47	230.27	2.88	-.10	422.3000	4.0340	-1.41	888.	888.	888.
11.000	240.3100	3.6157	-.32	223.03	2.65	.19	375.4000	4.7310	-1.67	885.	885.	885.
12.000	205.9100	3.1827	-.19	216.77	2.95	.68	331.0000	6.1150	-1.39	883.	883.	883.
13.000	175.7800	2.7514	-.01	213.20	3.49	.28	287.3000	7.1170	-.44	868.	868.	868.
14.000	149.7800	2.2464	.07	211.26	3.38	-.35	247.1000	6.2250	.13	860.	860.	860.
15.000	127.4000	1.8097	.12	208.77	2.90	-.11	212.6000	4.9110	.08	855.	855.	855.
16.000	109.1700	1.4523	.14	206.37	2.77	-.01	182.6000	4.0350	.12	851.	851.	851.
17.000	91.7340	1.1626	.20	204.93	2.89	-.09	156.0000	3.4770	.12	826.	826.	826.
18.000	77.7190	.9157	.28	204.75	3.06	-.08	132 3000	2.9040	.11	820.	820.	820.
19.000	65.9040	.7320	.29	206.87	2.75	-.14	111.0000	2.1420	.23	810.	810.	810.
20.000	56.0060	.5999	.19	210.02	2.37	.00	92.9100	1.5310	.37	793.	793.	793.
21.000	47.7270	.5028	.11	213.04	2.36	-.18	78.0500	1.1310	.31	748.	748.	748.
22.000	40.7450	.4446	.03	215.62	2.31	-.23	65.3400	.8530	.29	745.	745.	745.
23.000	34.8680	.4062	-.06	217 79	2.16	-.22	55.7800	.6281	.27	726.	726.	726.
24.000	29.8510	.3739	-.16	219.85	2.22	-.12	47.3000	.5173	.13	731.	731.	731.
25.000	25.6130	.3446	-.20	221.76	2.28	-.34	40.2400	.4569	-.03	723.	723.	723.
26.000	22.0110	.3203	-.26	223.65	2.32	-.27	34.2900	.4037	-.10	694.	694.	694.
27.000	18.9500	.2890	-.37	225.55	2.41	-.25	29.2600	.3653	-.12	614.	614.	614.
28.000	16.3280	.2657	-.41	227.65	2.48	-.21	24.9900	.3370	-.14	602.	602.	602.
29.000	14.0900	.2441	-.48	229.59	2.71	-.01	21.3800	.3155	-.17	510.	510.	510.
30.000	12 1770	.2219	-.50	231.47	2.67	-.06	18.3300	.2877	-.23	506.	506.	506.

TABLE 11. 5 THERMODYNAMIC STATISTICAL PARAMETERS, MAY

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1015.3000	3.8708	-.54	295.55	4.53	-.47	1188.0000	20.9800	.67	908.	908.	908.
.020	1013.0000	3.8430	-.55	295.28	4.56	-.45	1187.0000	21.0500	.62	952.	952.	952.
1.000	904.5700	3.4441	-.64	290.74	2.75	-.74	1079.0000	10.7300	.76	952.	952.	952.
2.000	803.9200	3.4020	-.60	284.99	2.49	-.74	979.6000	8.0290	.45	953.	953.	953.
3.000	712.7100	3.3488	-.64	279.70	2.48	-.13	885.9000	6.7230	-.24	953.	953.	953.
4.000	630.2000	3.4058	-.68	273.74	2.43	-.24	800.9000	5.7630	-.21	953.	953.	953.
5.000	555.8200	3.3762	-.72	267.41	2.30	-.44	723.3000	4.9540	-.07	953.	953.	953.
6.000	488.6600	3.3523	-.72	260.88	2.42	-.56	652.0000	4.3290	-.08	950.	950.	950.
7.000	428.1000	3.3412	-.76	254.21	2.57	-.74	586.3000	3.7590	-.17	949.	949.	949.
8.000	373.7700	3.3571	-.82	247.09	2.78	-.76	526.7000	3.3930	-.11	948.	948.	948.
9.000	324.9700	3.3549	-.84	239.55	2.82	-.63	472.4000	3.0120	-.37	946.	946.	946.
10.000	281.3100	3.3266	-.83	231.84	2.70	-.47	422.7000	2.7270	-.71	943.	943.	943.
11.000	242.3900	3.2350	-.73	224.35	2.47	-.16	376.4000	3.2610	-1.58	941.	941.	941.
12.000	207.8100	2.9143	-.65	217.52	2.39	.19	332.8000	4.3670	-1.58	938.	938.	938.
13.000	177.4500	2.5916	-.49	212.52	2.97	.51	291.0000	6.0520	-.91	931.	931.	931.
14.000	151.1100	2.1308	-.40	210.36	3.48	.04	250.3000	6.1750	-.28	927.	927.	927.
15.000	128.4900	1.7052	-.36	208.89	3.01	-.13	214.3000	4.8240	-.16	924.	924.	924.
16.000	109.1400	1.3694	-.29	207.25	2.66	-.02	183.5000	3.7960	-.28	919.	919.	919.
17.000	92.6400	1.0936	-.20	206.34	2.55	.11	156.4000	3.1310	-.29	893.	893.	893.
18.000	78.5850	.8726	-.13	206.52	2.75	-.02	132.6000	2.6510	-.08	891.	891.	891.
19.000	66.7500	.7022	-.16	208.87	2.59	-.11	111.3000	1.9430	.10	883.	883.	883.
20.000	56.8200	.5927	-.16	212.93	2.17	-.09	93.3700	1.3620	.05	870.	870.	870.
21.000	48.4850	.5097	-.13	214.95	1.90	-.21	78.5800	1.0320	.01	838.	838.	838.
22.000	41.4540	.4466	-.09	217.45	1.86	-.32	66.4200	.8407	-.08	835.	835.	835.
23.000	35.5180	.3919	-.07	219.52	1.78	-.33	56.3700	.6457	-.06	818.	818.	818.
24.000	30.4490	.3530	.00	221.48	1.86	-.16	47.9000	.5250	-.21	818.	818.	818.
25.000	26.1590	.3162	.02	223.40	1.87	-.20	40.7900	.4467	-.26	825.	825.	825.
26.000	22.5010	.2854	.03	225.29	1.89	-.09	34.7900	.3844	-.18	797.	797.	797.
27.000	19.3840	.2556	.00	227.15	2.00	-.12	29.7300	.3298	-.13	716.	716.	716.
28.000	16.7190	.2342	-.02	228.87	2.00	-.22	25.4500	.2889	-.09	699.	699.	699.
29.000	14.4300	.2120	-.05	230.63	2.17	.06	21.8300	.2729	-.19	617.	617.	617.
30.000	12.4780	.1946	-.08	232.37	2.14	-.08	18.7100	.2401	-.04	609.	609.	609.

TABLE 11. 6 THERMODYNAMIC STATISTICAL PARAMETERS, JUNE
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1014.6000	3.2395	-.33	298.36	3.68	-.13	1174.0000	16.5900	.25	829.	829.	829.
.020	1012.3000	3.3123	-.36	298.22	3.67	- 17	1172.0000	16.5500	.29	845.	845.	845.
1.000	905.0500	2.8644	-.53	293.36	2.03	-.05	1058.0000	8.2660	.09	848.	848.	848.
2.000	805.2500	2.6723	-.50	286.93	1.82	.08	973.3000	6.5340	.05	848.	848.	848.
3.000	714.4800	2.51[illegible]0	-.46	281.34	1.70	.23	882.1000	5.1970	-.59	848.	848.	848.
4.000	632.3700	2.4369	-.28	275.60	1.62	.11	797.7000	4.4630	-.62	848.	848.	848.
5.000	552.3100	2.3545	-.21	269.92	1.74	.04	719.5000	4.2160	-.33	848.	848.	848.
6.000	491.5300	2.3212	-.19	263.83	1.85	.09	648.3000	3.8950	-.51	846.	846.	846.
7.000	431.2900	2.3030	-.17	257.45	1.98	-.01	583.1000	3.4090	-.38	844.	844.	844.
8.000	377.2500	2.3217	-.16	250.69	2.22	-.07	523.9000	3.0990	-.17	842.	842.	842.
9 000	328.7200	2.3618	-.10	243.45	2.42	-.03	470.1000	2.9050	-.10	839.	839.	839.
10.000	285.2400	2.3779	-.07	235.78	2.46	.04	421.2000	2.5780	-.59	838.	838.	838.
11.000	246.4300	2.4077	-.06	228.01	2.40	.12	376.5000	2.3960	-1.02	834.	834.	834.
12 000	211.6400	2.2490	-.03	220.57	2.31	.10	334.3000	2.6670	-.90	831.	831.	831.
13.000	181.0700	2.1389	.01	213.99	2.30	.18	294.8000	3.6220	-.73	818.	818.	818.
14.000	154.2200	1.8617	.08	209.31	2.57	.30	256.7000	4.6200	-.35	817.	817.	817.
15.000	130.9400	1.4994	.15	206.32	2.94	-.02	221.2000	4.8020	.04	813.	813.	813.
15.000	111.0000	1.1556	.16	204.81	2.85	.01	188 8000	3.9680	.16	811.	811.	811.
17.000	94.0580	.8747	.12	204.94	2.68	-.04	159.9000	3.0190	.28	783.	783.	783.
18.000	79.7410	.6359	.06	206.93	2.39	-.09	134.3000	2.1100	.23	782.	782.	782.
19.000	67.7800	.5663	.08	210.08	1.87	-.15	112.4000	1.4140	.16	776.	776.	776.
20.000	57.7490	.4843	.05	212.99	1.59	-.09	94.4600	1.0090	.19	770.	770.	770.
21 000	49.3020	.4223	-.03	215.51	1.60	-.10	79.7000	.8377	.13	742.	742.	742.
22.000	42.1720	.3703	-.06	217.83	1.57	-.33	67.4500	.6912	.02	739.	739.	739.
23.000	36.1420	.3252	-.02	219.9[illegible]	1.53	-.25	57.2600	.5749	.02	717.	717.	717.
24 000	30.9950	.2889	-.01	221.85	1.61	-.15	48.6700	.4963	-.03	715.	715.	715.
25.000	26.6310	.2583	-.08	223.80	1.59	-.08	41.4600	.4147	-.16	720.	720.	720.
26.000	22.9110	.2301	-.08	225.63	1.60	-.13	35.3700	.3421	-.08	693.	693.	693.
27.000	19.7320	.2100	-.09	227.41	1.83	-.04	30.2300	.3261	-.04	617.	617.	617.
28.000	17.0200	.1879	-.13	229.08	1.68	-.10	25.8800	.2649	-.18	600.	600.	600.
29.000	14.6910	.1653	-.02	230.69	1.86	-.14	22.1900	.2182	-.19	505.	509.	509.
30.000	12.7020	.1469	-.09	232.34	1.84	-.15	19.0500	.1987	-.18	503.	503.	503.

TABLE II. 7 THERMODYNAMIC STATISTICAL PARAMETERS, JULY
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1016.0000	2.6849	-.41	299.39	3.36	.08	1171.0000	14.7200	.09	780.	780.	780.
.020	1013.7000	2.6932	-.42	299.29	3.33	.08	1169.0000	14.5900	.09	785.	785.	785.
1.000	906.7600	2.3542	-.50	294.27	1.54	-.05	1066.0000	6.3230	.06	789.	789.	789.
2.000	807.1800	2.1838	-.45	289.10	1.31	-.24	971.1000	4.9100	.12	789.	789.	789.
3.000	716.5800	2.0325	-.29	282.29	1.21	-.04	881.3000	4.0820	-.01	788.	788.	788.
4.000	634.5500	1.9078	-.41	276.56	1.33	-.01	797.3000	3.9210	-.16	787.	787.	787.
5.000	560.5200	1.7781	-.31	271.00	1.35	-.02	719.3000	3.6730	-.31	786.	786.	786.
6.000	493.8100	1.6787	-.26	265.27	1.45	-.02	647.7000	3.4070	-.05	785.	785.	785.
7.000	433.6300	1.6287	-.18	259.12	1.51	-.15	592.5000	3.0370	.16	783	783.	783.
8.000	379.6900	1.5994	-.18	252.65	1.63	-.41	523.2000	2.7800	.19	780.	780.	780.
9.000	331.2200	1.6030	-.20	245.61	1.84	-.35	469.6000	2.6660	.06	778.	778.	778.
10.000	287.7700	1.6237	-.23	237.94	1.94	-.27	421.2000	2.3350	-.03	774.	774.	774.
11.000	248.9700	1.6479	-.27	230.02	1.94	-.20	377.1000	1.9370	-.08	773.	773.	773.
12.000	214.0100	1.5937	-.18	222.06	1.87	-.17	335.8000	1.7960	-.48	772.	772.	772.
13.000	183.2600	1.5656	-.09	214.51	1.85	.01	297.6000	2.2400	-1.26	758.	758.	758.
14.000	156.0600	1.4174	.05	208.38	1.96	.44	260.9000	3.1390	-1.11	755.	755.	755.
15.000	132.3700	1.1604	.22	204.61	2.54	.50	225.4000	3.8090	-.60	744.	744.	744.
16.000	112.0600	.9178	.17	203.82	2.64	.28	191.6000	3.2670	-.11	735.	735.	735.
17.000	94.8980	.7315	.07	205.07	2.47	-.04	161.2000	2.4620	.28	710.	710.	710.
18.000	80.4960	.6194	.00	207.79	2.15	-.17	135.0000	1.7020	.44	708.	708.	708.
19.000	68.4570	.5317	-.04	210.79	1.81	.21	113.1000	1.1930	.12	701.	701.	701.
20.000	58.3560	.4686	.05	213.60	1.67	.21	95.1800	.9466	.09	695.	696.	696.
21.000	49.8440	.4041	.01	215.98	1.74	-.17	80.4000	.8182	.23	674.	674.	[illegible]4.
22.000	42.6500	.3607	-.02	217.91	1.59	-.23	68.1800	.6465	.14	664.	664.	664.
23.000	36.5450	.3214	-.09	219.76	1.60	-.54	57.9300	.5321	.27	656.	656.	656.
24.000	31.3420	.2895	-.13	221.66	1.71	-.31	49.2600	.4870	-.01	653.	653.	653.
25.000	26.9180	.2618	-.20	223.42	1.65	-.15	41.9700	.4082	-.05	646.	646.	646.
26.000	23.1530	.2326	-.30	225.07	1.68	-.30	35.8400	.3602	-.09	615.	615.	615.
27.000	19.9360	.2059	-.25	226.75	2.00	.13	30.6300	.3355	-.13	586.	586.	566.
28.000	17.1900	.1880	-.23	228.41	1.73	-.15	26.2200	.2602	-.10	568.	568.	568.
29.000	14.8320	.1749	-.26	230.05	2.11	.08	22.4000	.2475	-.16	500.	500.	500.
30.000	12.8090	.1593	-.32	231.45	1.96	-.34	19.2900	.2027	-.36	477.	477.	477.

TABLE II. 8 THERMODYNAMIC STATISTICAL PARAMETERS, AUGUST

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1015.5000	2.6720	-.14	299.04	3.42	.29	1172.0000	14.9500	-.20	826.	826.	826.
.020	1013.2000	2.6588	-.13	298.91	3.40	.28	1170.0000	14.8100	-.18	828.	828.	828.
1.000	906.2600	2.3445	-.15	294.08	1.58	.04	1066.0000	5.9660	-.15	829.	829.	829.
2.000	806.6900	2.2769	-.10	287.96	1.46	-.52	970.9000	4.8640	.40	829.	829.	829.
3.000	716.1400	2.1714	-.09	282.33	1.36	-.29	880.5000	4.0120	-.09	828.	928.	828.
4.000	634.2100	2.0901	-.20	276.70	1.42	-.31	796.5000	3.8990	-.21	826.	826.	826.
5.000	560.2300	1.9924	-.30	271.10	1.42	-.35	718.6000	3.4360	-.19	826.	826.	826.
6.000	493.5600	1.9366	-.45	265.30	1.45	-.44	647.3000	3.0870	-.23	825.	825.	825.
7.000	433.4400	1.8852	-.62	259.12	1.52	-.70	582.2000	2.7500	-.09	822.	822.	822.
8.000	379.5000	1.8475	-.73	252.59	1.69	-.81	523.1000	2.6040	.08	818.	818.	818.
9.000	331.0400	1.8485	-.84	245.52	1.84	-.63	469.5000	2.4200	.02	817.	817.	817.
10.000	287.6200	1.8365	-.90	237.89	1.85	-.28	421.0000	2.1590	-.23	814.	814.	814.
11.000	248.8300	1.8199	-.89	229.97	1.78	.11	376.9000	2.0560	-.55	810.	810.	810.
12.000	213.9000	1.6750	-.67	222.14	1.68	.33	335.5000	2.4780	-1.70	808.	808.	808.
13.000	183.1800	1.5469	-.45	214.71	1.91	.50	297.2000	3.1620	-1.94	797.	797.	797.
14.000	156.0200	1.3378	-.21	208.55	2.36	.71	260.7000	3.6970	-1.36	796.	796.	796.
15.000	132.3600	1.1140	-.10	204.82	2.67	.50	225.2000	3.6440	-.65	795.	795.	795.
16.000	112.1000	.9171	-.22	204.09	2.47	.07	191.4000	2.9760	.03	787.	787.	787.
17.000	94.9660	.7485	-.46	205.35	2.22	-.15	161.1000	2.2870	.30	758.	758.	758.
18.000	80.5700	.6332	-.49	207.93	2.00	-.22	135.0000	1.6430	.07	756.	756.	756.
19.000	68.5220	.5440	-.51	210.84	1.73	-.12	113.2000	1.1580	-.15	751.	751.	751.
20.000	58.4110	.4852	-.46	213.47	1.55	-.07	95.3300	.8736	-.22	744.	744.	744.
21.000	49.8880	.4165	-.28	215.66	1.54	-.16	80.5900	.7237	.00	725.	725.	725.
22.000	42.6740	.3703	-.16	217.52	1.50	-.14	68.3500	.6040	-.13	714.	714.	714.
23.000	36.5510	.3356	-.13	219.29	1.50	-.11	58.0700	.4980	-.15	694.	694.	694.
24.000	31.3330	.3100	-.28	221.03	1.55	-.07	49.3800	.4531	-.28	694.	694.	694.
25.000	26.8980	.2873	-.33	222.76	1.57	-.17	42.0700	.3979	-.32	688.	683.	683.
26.000	23.1220	.2593	-.30	224.36	1.66	-.16	35.9000	.3392	-.35	661.	661.	661.
27.000	19.9030	.2319	-.22	225.96	1.83	-.03	30.6800	.3179	-.13	620.	620.	620.
28.000	17.1490	.2098	-.19	227.58	1.71	-.16	26.2500	.2694	-.10	590.	590.	590.
29.000	14.7880	.1922	-.19	229.14	2.14	.04	22.4800	.2571	.10	511.	511.	511.
30.000	12.7730	.1757	-.20	230.60	2.01	-.17	19.3000	.2117	-.16	435.	435.	435.

TABLE 11. 9 THERMODYNAMIC STATISTICAL PARAMETERS, SEPTEMBER

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1014.8000	3.2460	-.92	297.73	4.00	-.24	1177.0000	17.7900	.45	724.	724.	724.
.020	1012.5000	3.2469	-.93	297.59	3.99	-.28	1175.0000	17.8000	.49	747.	747.	747.
1.000	905.1300	2.9777	-1.06	292.98	1.97	-.55	1069.0000	8.0130	.53	746.	746.	746.
2.000	805.2700	2.8244	-.84	287.10	1.74	-.61	972.5000	6.0000	-.05	746.	746.	746.
3.000	714.6900	2.6153	-.69	282.05	1.53	-.17	879.9000	5.1100	-.39	746.	746.	746.
4.000	632.8100	2.4927	-.47	276.73	1.51	-.01	791.8000	4.5430	-.48	746.	746.	746.
5.000	559.0100	2.3242	-.45	271.18	1.63	-.13	716.3000	4.4350	-.61	746.	746.	746.
6.000	492.4500	2.2690	-.39	265.11	1.79	-.10	646.1000	4.2040	-1.08	745.	745.	745.
7.000	432.3500	2.2036	-.40	258.65	1.96	-.44	581.6000	3.9220	-1.00	744.	744.	744.
8.000	378.4500	2.1799	-.45	251.87	2.19	-.46	522.9000	3.6330	-.70	741.	741.	741.
9.000	329.9600	2.2021	-.49	244.63	2.34	-.35	469.5000	3.3760	-.77	739.	739.	739.
10.000	286.5300	2.2107	-.52	237.01	2.29	-.14	420.8000	3.0260	-1.08	739.	739.	739.
11.000	247.7500	2.1860	-.49	229.27	2.18	.06	376.4000	2.4600	-.88	737.	737.	737.
12.000	212.9200	2.0341	-.36	221.73	1.90	.26	334.5000	2.5930	-.91	737.	737.	737.
13.000	182.3200	1.8824	-.25	214.74	1.88	.26	295.8000	3.2810	-.80	723.	723.	723.
14.000	155.3100	1.6338	-.10	208.79	2.08	.08	259.2000	3.8440	-.53	722.	722.	722.
15.000	131.7400	1.3435	.04	204.43	2.38	.10	224.5000	3.8590	-.29	718.	718.	719.
16.000	111.4300	1.0813	.08	202.73	2.78	-.02	191.6000	3.5720	.03	710.	710.	710.
17.000	94.3310	.8591	.02	203.54	2.95	.03	161.5000	2.9630	.36	680.	680.	680.
18.000	79.9160	.7186	-.01	206.48	2.72	-.15	134.9000	2.1420	.40	673.	673.	673.
19.000	67.9110	.6147	.00	209.87	2.09	-.03	112.7000	1.3810	.10	664.	664.	664.
20.000	57.8520	.5411	.05	212.78	1.68	-.14	94.7200	.9765	.02	657.	657.	657.
21.000	49.3850	.4809	.00	215.09	1.66	-.16	79.9900	.8508	.09	639.	633.	639.
22.000	42.2270	.4303	-.01	216.99	1.53	-.37	67.7900	.6805	.15	635.	635.	635.
23.000	36.1590	.3871	-.03	218.86	1.50	-.22	57.5600	.5654	.08	619.	618.	618.
24.000	30.9870	.3514	-.10	220.65	1.69	-.05	48.9200	.5124	-.19	617.	617.	617.
25.000	26.5990	.3091	-.03	222.34	1.65	-.10	41.6800	.4197	.00	613.	613.	613.
26.000	22.8580	.2802	-.03	223.84	1.69	-.10	35.5700	.3644	-.01	586.	586.	586.
27.000	19.6690	.2530	-.08	225.29	1.82	-.01	30.4100	.3418	-.02	544.	544.	544.
28.000	16.9450	.2284	-.10	226.76	1.76	-.09	26.0300	.2859	-.11	534.	534.	534.
29.000	14.6080	.2055	-.15	228.24	2.03	-.03	22.3000	.2717	-.08	456.	456.	456.
30.000	12.6120	.1821	-.11	229.75	1.93	-.19	19.1200	.2264	-.05	449.	449.	449.

TABLE II. 10 THERMODYNAMIC STATISTICAL PARAMETERS, OCTOBER
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1016.5000	3.7108	-.04	293.03	5.53	-.50	1202.0000	26.8100	.64	766.	766.	766.
.020	1014.3000	3.7514	.02	292.80	5.53	-.51	1200.0000	26.8700	.65	815.	815.	815.
1.000	906.3800	4.9210	1.24	289.44	3.26	-.95	1086.0000	14.2700	.75	819.	819.	819.
2.000	805.2100	4.6419	1.08	284.69	2.51	-.68	982.4000	9.3570	.41	820.	820.	820.
3.000	713.8600	4.3855	.98	280.03	2.39	-.27	886.2000	7.8650	-.01	820.	820.	820.
4.000	631.4300	4.1828	.85	274.85	2.42	-.37	799.1000	7.1710	.15	819.	819.	819.
5.000	557.2600	3.9567	.66	269.05	2.54	-.40	720.6000	6.3580	.18	819.	819.	819.
6.000	490.2900	3.9008	.48	262.50	2.77	-.10	650.0000	5.8600	-.02	817.	817.	817.
7.000	429.8300	3.8364	.36	255.57	2.94	-.21	585.4000	5.1590	-.11	817.	817.	817.
8.000	375.5800	3.8027	.24	248.49	3.18	-.13	526.2000	4.8610	-.31	806.	806.	806.
9.000	326.8200	3.7700	.16	241.12	3.30	-.06	471.8000	4.4170	-.38	803.	803.	803.
10.000	283.2200	3.7092	.12	233.72	3.19	.02	422.0000	4.0730	-.47	795.	795.	795.
11.000	244.3300	3.5923	.10	226.52	2.84	.01	375.9000	3.9420	-.30	789.	789.	789.
12.000	209.8000	3.2639	.11	219.87	2.44	-.12	332.4000	4.3430	-.29	786.	786.	786.
13.000	179.4600	2.9516	.14	213.95	2.06	-.18	292.2000	4.9510	-.25	775.	775.	775.
14.000	152.8100	2.5141	.17	208.88	2.25	.11	254.9000	5.3730	-.15	771.	771.	771.
15.000	129.6500	2.0542	.20	204.96	2.56	.04	220.4000	5.3070	.07	768.	768.	768.
16.000	109.7400	1.6255	.23	202.89	2.93	-.08	188.5000	4.8120	.21	756.	756.	756.
17.000	92.9480	1.2550	.24	203.12	3.12	-.12	159.3000	3.9350	.20	727.	727.	727.
18.000	78.6110	.9884	.24	205.41	2.88	-.01	133.4000	2.8630	.19	719.	719.	719.
19.000	65.7410	.8106	.17	208.67	2.37	-.07	111.4000	1.9800	.23	711.	711.	711.
20.000	56.8070	.6832	.14	211.57	2.01	-.10	93.5400	1.4450	.22	703.	703.	703.
21.000	48.4540	.5809	.07	213.91	1.94	.04	78.9200	1.1250	.29	675.	675.	675.
22.000	41.3890	.5047	.09	215.92	1.83	-.10	66.7800	.9018	.05	673.	673.	673.
23.000	35.4200	.4387	.06	217.82	1.62	-.03	56.6500	.7122	-.03	667.	667.	667.
24.000	30.3280	.3858	.11	219.60	1.78	.04	48.1100	.6433	.01	669.	669.	669.
25.000	26.0150	.3386	.06	221.22	1.78	.04	40.9700	.5430	-.04	667.	667.	667.
26.000	22.3410	.3001	.02	222.72	1.88	.18	34.9400	.4595	-.11	652.	652.	652.
27.000	19.2060	.2679	-.01	224.11	2.08	.16	29.8600	.3981	-.19	608.	608.	608.
28.000	16.5260	.2420	.00	225.44	2.22	.18	25.5400	.3346	-.28	602.	602.	602.
29.000	14.2340	.2223	.03	226.80	2.42	.10	21.8600	.2983	-.12	506.	506.	506.
30.000	12.2730	.2013	-.04	228.18	2.52	.11	18.7400	.2588	-.03	501.	501.	501.

TABLE II. 11 THERMODYNAMIC STATISTICAL PARAMETERS. NOVEMBER
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1018.4000	5.2240	-.24	287.53	6.28	-.47	1229.0000	32.1700	.51	635.	635.	635.
.020	1016.3000	5.2244	-.28	287.23	6.19	-.45	1228.0000	31.8300	.47	753.	753.	753.
1.000	905.1000	4.4245	-.40	285.26	4.30	-1.16	1102.0000	18.5100	.80	753.	753.	753.
2.000	802.8000	4.2946	-.56	282.06	3.44	-1.44	989.3000	11.9100	.77	753.	753.	753.
3.000	711.0300	4.2596	-.87	277.80	3.27	-1.01	890.1000	9.2250	.27	753.	753.	753.
4.000	628.2400	4.3471	-1.07	272.42	3.12	-.83	802.2000	7.2430	.13	751.	751.	751.
5.000	553.8100	4.3723	-1.19	266.46	3.08	-.96	723.1000	6.2530	.20	750.	750.	750.
6.000	486.6200	4.3978	-1.16	259.89	3.09	-.80	651.6000	5.3990	.10	750.	750.	750.
7.000	426.0500	4.3637	-1.15	253.09	3.15	-.88	585.9000	4.9140	-.04	749.	749.	749.
8.000	371.8300	4.3014	-1.11	245.93	3.23	-.78	526.3000	4.5930	-.42	747.	747.	747.
9.000	323.0800	4.1975	-1.02	238.52	3.09	-.38	471.5000	4.4560	-1.06	745.	745.	745.
10.000	279.4300	4.0287	-.87	231.09	2.92	-.16	421.2000	4.7300	-1.75	742.	742.	742.
11.000	240.7300	3.7724	-.72	223.98	2.71	.08	374.4000	5.2590	-1.85	742.	742.	742.
12.000	206.3800	3.3130	-.61	217.50	2.70	.25	330.6000	5.8950	-1.42	741.	741.	741.
13.000	176.2300	2.8990	-.46	212.17	2.86	.45	289.4000	6.4000	-.90	730.	730.	730.
14.000	149.9300	2.4039	-.35	208.31	3.01	.27	250.8000	6.1170	-.59	730.	730.	730.
15.000	127.2300	1.9286	-.22	205.48	2.89	.53	215.8000	5.3010	-.56	724.	724.	724.
16.000	107.7400	1.5077	-.07	203.51	3.02	.59	184.5000	4.6330	-.43	712.	712.	712.
17.000	91.1340	1.1582	.03	203.02	3.24	.62	156.5000	3.9550	-.29	686.	686.	686.
18.000	77.1590	.8688	.09	204.11	3.49	.43	131.7000	3.1800	-.05	674.	674.	674.
19.000	65.4230	.6844	.21	206.86	3.13	.15	110.2000	2.2440	.08	668.	668.	668.
20.000	55.5900	.5605	.20	209.66	2.74	.20	92.3800	1.5080	.00	655.	655.	655.
21.000	47.3430	.4818	.24	211.57	2.54	.03	77.8200	1.1150	.07	641.	641.	641.
22.000	40.3730	.4329	.30	214.04	2.51	.01	65.7200	.8673	-.11	639.	639.	639.
23.000	34.5090	.3958	.32	215.95	2.44	.01	55.6700	.6714	-.16	626.	626.	626.
24.000	29.5140	.3629	.33	217.08	2.71	.00	47.1900	.5866	-.02	615.	615.	615.
25.000	25.2830	.3362	.30	219.47	2.80	-.31	40.1400	.5119	.31	613.	613.	613.
26.000	21.6880	.3129	.21	220.90	2.79	-.31	34.2000	.4134	.18	602.	602.	602.
27.000	18.6150	.2922	.20	222.21	2.89	-.21	29.1800	.3639	.21	566.	566.	566.
28.000	15.9950	.2726	.13	223.49	3.09	-.07	24.9300	.3403	-.01	563.	563.	563.
29.000	13.7670	.2476	-.02	224.78	3.22	.16	21.3400	.3114	.18	478.	478.	478.
30.000	11.8540	.2287	-.08	226.27	3.21	.25	18.2500	.2919	.29	474.	474.	474.

TABLE 11. 12 THERMODYNAMIC STATISTICAL PARAMETERS, DECEMBER

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1019.7000	5.9569	-.24	284.38	6.57	-.41	1245.0000	35.8700	.45	681.	681.	681.
.020	1017.6000	5.9581	-.23	284.07	6.55	-.38	1244.0000	35.6600	.40	791.	791.	791.
1.000	905.1200	4.7027	-.45	283.10	5.10	-.70	1111.0000	22.7800	.59	791.	791.	791.
2.000	802.2300	4.5035	-.53	280.23	3.93	-.73	995.1000	13.8400	.60	793.	793.	793.
3.000	709.9100	4.5570	-.55	276.15	3.59	-.55	894.0000	9.9790	.38	793.	793.	793.
4.000	626.8000	4.7007	-.55	270.88	3.40	-.54	805.0000	7.6700	.14	793.	793.	793.
5.000	552.1100	4.7822	-.61	264.81	3.41	-.42	725.4000	6.5520	.02	791.	791.	791.
6.000	484.7600	4.8392	-.57	258.32	3.37	-.38	653.1000	5.4750	-.12	787.	787.	787.
7.000	424.0700	4.8845	-.57	251.46	3.55	-.47	587.0000	4.9030	-.06	785.	785.	785.
8.000	369.7400	4.8320	-.54	244.23	3.69	-.49	527.0000	4.4630	-.39	784.	784.	784.
9.000	320.9400	4.7572	-.52	236.76	3.66	-.49	472.0000	4.5690	-.02	782.	782.	782.
10.000	277.3600	4.5967	-.47	229.40	3.35	-.17	421.2000	4.7250	-1.55	778.	778.	778.
11.000	239.6400	4.3105	-.41	222.46	2.96	.34	373.7000	5.7600	-1.33	777.	777.	777.
12.000	204.4300	3.8024	-.39	216.37	3.07	.62	329 2000	7.0270	-.95	777.	777.	777.
13.000	174.4200	3.2498	-.34	212.00	3.39	.38	286.7000	7.7760	-.38	759.	759.	759.
14.000	148.4400	2.6550	-.31	209.06	3.35	-.02	247.4000	6.9930	-.13	752.	752.	752.
15.000	126.0400	2.1139	-.27	206.39	2.86	.23	212.8000	5.4710	-.40	742.	742.	742.
16.000	106.6100	1.6756	-.17	204.13	2.85	.46	182.3000	4.6940	-.43	737.	737.	737.
17.000	90.3050	1.2971	-.07	203.06	3.15	.42	155.1000	4.1000	-.29	704.	704.	704.
18.000	76.4540	.9814	.03	203.34	3.50	.24	131.0000	3.4380	-.13	696.	696.	696.
19.000	64.7640	.7516	.05	205.48	3.30	.08	103.8000	2.5530	.00	684.	684.	684.
20.000	54.9650	.5893	.03	209.09	2.98	.15	92.0400	1.8130	.01	666.	666.	666.
21.000	46.7600	.4852	-.14	210.60	2.74	.17	77.3600	1.2930	.05	642.	642.	642.
22.000	39.8420	.4180	-.21	212.84	2.69	.24	65 2200	.9812	-.07	632.	632.	632.
23.000	34.0160	.3780	-.26	214.68	2.75	.42	55.2100	.7641	-.09	625.	625.	625.
24.000	29.0640	.3423	-.27	216.45	3.21	.69	46.7800	.6810	-.28	612.	612.	612.
25.000	24.8750	.3218	-.25	218 26	3.94	1.07	39.7100	.6246	-.73	598.	598.	598.
26.000	21.3160	.3124	-.14	219.94	4.27	1.00	33.7700	.5203	-.67	589.	589.	589.
27.000	18.2990	.3042	.02	221.70	4.50	.33	28.7600	.4170	-.49	550.	550.	550.
28.000	15.7190	.2978	.16	223.40	4.63	.65	24.5200	.3545	-.25	543.	543.	543.
29.000	13.5230	.2832	.30	224.99	4.50	.57	20.9400	.3007	-.16	459.	459.	459.
30.000	11.6470	.2686	.34	226.79	4.28	.26	17.8900	.2864	-.44	451.	451.	451.

TABLE II. 13 THERMODYNAMIC STATISTICAL PARAMETERS, ANNUAL

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	MEAN P MB	S.D. P MB	SKEW P	MEAN T DEG K	S.D. T DEG K	SKEW T	MEAN D G/M3	S.D. D G/M3	SKEW D	NOBS P	NOBS T	NOBS D
.000	1016.8000	4.9170	.18	292.04	7.91	-.66	1206.0000	39.6200	.84	9351.	9351.	9351.
.020	1014.6000	4.9998	.18	291.49	7.98	-.60	1206.0000	40.0700	.77	10152.	10151.	10151.
1.000	904.9500	4.1814	-.43	288.11	6.03	-.90	1090.0000	24.9500	.96	10169.	10169.	10169.
2.000	803.5500	4.4773	-.68	283.47	4.61	-.96	984.5000	14.9900	.93	10174.	10174.	10174.
3.000	711.9900	4.8806	-.78	278.59	4.11	-.97	888.4000	10.3400	.84	10171.	10171.	10171.
4.000	629.3300	5.2641	-.83	273.04	3.99	-.87	801.7000	7.9370	.56	10165.	10165.	10165.
5.000	554.9100	5.5287	-.87	267.06	4.14	-.73	722.9000	6.7700	.37	10158.	10158.	10158.
6.000	487.7900	5.7583	-.82	260.70	4.35	-.57	651.2000	5.8230	.26	10133.	10133.	10133.
7.000	427.3000	5.9118	-.76	254.05	4.58	-.50	585.5000	5.0800	.11	10116.	10116.	10116.
8.000	373.0700	6.0135	-.70	247.04	4.85	-.40	525.7000	4.6530	-.06	10078.	10078.	10078.
9.000	324.3800	6.0503	-.61	239.72	4.92	-.26	471.2000	4.3800	-.70	10049.	10049.	10049.
10.000	280.8400	5.9370	-.51	232.78	4.69	-.15	421.1000	4.5370	-1.89	10013.	10013.	10013.
11.000	242.0900	5.7998	-.39	225.15	4.17	-.05	374.6000	5.6080	-2.07	9977.	9977.	9977.
12.000	207.6800	5.2495	-.30	218.74	3.68	-.19	330.8000	7.1220	-1.55	9947.	9947.	9947.
13.000	177.5000	4.6874	-.18	213.72	3.15	-.06	289.4000	8.4840	-.80	9787.	9787.	9787.
14.000	151.2100	3.9374	-.12	209.90	3.14	.22	251.0000	8.6570	-.29	9743.	9743.	9743.
15.000	128.4400	3.1927	-.11	206.76	3.24	.19	216.5000	7.6400	-.07	9684.	9684.	9684.
16.000	108.8900	2.5880	-.10	204.82	3.15	.13	185.3000	6.0480	-.10	9600.	9600.	9600.
17.000	92.2450	2.1361	-.09	204.42	3.12	-.04	157.2000	4.5590	-.23	9234.	9234.	9234.
18.000	78.1610	1.8252	-.03	205.54	3.36	-.32	132.5000	3.3480	-.38	9132.	9132.	9132.
19.000	66.3400	1.6085	.03	208.09	3.28	-.45	111.1000	2.4730	-.40	9022.	9022.	9022.
20.000	56.4500	1.4419	.06	210.92	3.06	-.48	93.2400	1.9470	-.32	8843.	8843.	8843.
21.000	48.1410	1.2915	.05	213.45	2.95	-.49	78.5600	1.6610	-.15	8468.	8468.	8469.
22.000	41.1150	1.1613	.04	215.65	2.89	-.54	66.4200	1.4670	-.06	8376.	8376.	8376.
23.000	35.1750	1.0427	.01	217.54	2.91	-.55	56.3200	1.2720	.02	8214.	8214.	8214.
24.000	30.1150	.9379	-.02	219.36	3.08	-.52	47.8200	1.1320	.04	8198.	8198.	8198.
25.000	25.8350	.8413	-.06	221.09	3.25	-.55	40.7000	.9974	.00	8111.	8111.	8111.
26.000	22.1790	.7597	-.10	222.71	3.40	-.52	34.6900	.8884	.00	7854.	7854.	7854.
27.000	19.0770	.6853	-.14	224.38	3.55	-.41	29.6100	.8056	-.01	7166.	7166.	7166.
28.000	16.4170	.6190	-.17	226.00	3.67	-.50	25.3000	.7294	-.10	7014.	7014.	7014.
29.000	14.1590	.5657	-.23	227.70	3.77	-.42	21.6600	.6594	-.12	5904.	5904.	5904.
30.000	12.2150	.4933	-.26	229.37	3.73	-.50	18.5500	.6005	-.18	5805.	5306.	5205.

TABLE III.1 MOISTURE RELATED STATISTICAL PARAMETERS, JANUARY

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	10.107	5.970	.49	284.47	7.42	-.36	277.63	9.85	-.47	807.	807.
.020	9.738	5.835	.56	284.09	7.32	-.32	277.06	9.86	-.45	930.	930.
1.000	7.427	4.994	.30	282.75	5.91	-.69	271.89	12.30	-.65	868.	932.
2.000	4.829	3.382	.44	279.66	4.32	-.90	265.07	11.77	-.61	809.	931.
3.000	2.870	2.170	.75	275.17	3.87	-1.10	259.44	10.95	-.42	776.	931.
4.000	1.657	1.336	1.11	269.74	3.66	-.71	252.87	10.29	-.38	739.	931.
5.000	1.017	.881	1.21	263.72	3.73	-.70	246.97	10.27	-.26	725.	931.
6.000	.596	.505	1.23	257.03	3.72	-.78	241.45	9.54	-.29	725.	929.
7.000	.360	.294	1.10	250.26	3.74	-.60	236.43	9.07	-.39	745.	927.
8.000	.193	.149	1.02	242.97	3.82	-.51	230.73	8.22	-.44	734.	923.
9.000	.091	.066	.97	235.47	3.67	-.31	224.24	7.37	-.56	674.	920.
10.000	.035	.025	1.05	229.06	3.32	-.12	216.33	6.71	-.74	516.	915.
11.000	.015	.010	1.02	221.59	3.10	.25	210.01	5.91	-1.03	440.	910.
12.000	.007	.005	2.01	216.54	3.96	.42	204.61	5.51	-.94	422.	907.
13.000	.004	.003	2.15	213.47	4.01	-.11	200.94	5.52	-.67	301.	890.
14.000	.003	.002	.53	211.11	3.00	-.12	198.64	5.24	-.87	80.	885.
15.000	.002	.001	.40	207.90	2.76	.31	195.68	2.98	-.55	22.	884.
16.000	99.999	99.999	999.99	205.16	3.03	.42	999.99	99.99	999.99	0.	874.
17.000	99.999	99.999	999.99	203.79	3.30	.42	999.99	99.99	999.99	0.	841.
18.000	99.999	99.999	999.99	203.74	3.60	.23	999.99	99.99	999.99	0.	821.
19.000	99.999	99.999	999.99	205.38	3.33	.13	999.99	99.99	999.99	0.	806.
20.000	99.999	99.999	999.99	207.76	2.89	.15	999.99	99.99	999.99	0.	776.
21.000	99.999	99.999	999.99	210.28	2.69	.34	999.99	99.99	999.99	0.	742.
22.000	99.999	99.999	999.99	212.59	2.74	.53	999.99	99.99	999.99	0.	727.
23.000	99.999	99.999	999.99	214.39	2.70	.43	999.99	99.99	999.99	0.	718.
24.000	99.999	99.999	999.99	216.13	2.79	.37	999.99	99.99	999.99	0.	715.
25.000	99.999	99.999	999.99	217.66	2.84	.26	999.99	99.99	999.99	0.	694.
26.000	99.999	99.999	999.99	219.17	2.89	.12	999.99	99.99	999.99	0.	686.
27.000	99.999	99.999	999.99	220.76	3.11	.26	999.99	99.99	999.99	0.	629.
28.000	99.999	99.999	999.99	222.48	3.70	.45	999.99	99.99	999.99	0.	615.
29.000	99.999	99.999	999.99	224.03	3.72	.45	999.99	99.99	999.99	0.	492.
30.000	99.999	99.999	999.99	225.80	3.84	.48	999.99	99.99	999.99	0.	485.

TABLE III. 2 MOISTURE RELATED STATISTICAL PARAMETERS, FEBRUARY

STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	9.480	5.499	.66	284.78	6.85	-.25	276.98	9.13	-.33	744.	744.
.020	9.463	5.538	.68	284.81	6.78	-.26	276.93	9.15	-.30	868.	868.
1.000	6.348	4.411	.64	282.03	5.55	-.30	270.18	10.97	-.32	821.	870.
2.000	4.017	3.156	.80	278.71	4.45	-.55	263.47	11.39	-.19	747.	870.
3.000	2.446	2.035	1.08	274.23	4.13	-.62	257.27	10.82	-.17	715.	870.
4.000	1.492	1.267	1.23	268.71	3.94	-.65	251.47	10.27	-.19	709.	870.
5.000	.938	.830	1.30	262.56	3.89	-.48	246.13	9.97	-.11	693.	869.
6.000	.565	.479	1.20	256.04	3.63	-.36	240.84	9.60	-.33	692.	865.
7.000	.331	.270	1.04	249.21	3.88	-.25	235.48	9.33	-.49	707.	862.
8.000	.181	.139	.90	242.04	3.92	-.14	229.97	8.57	-.60	685.	860.
9.000	.086	.062	.94	234.83	3.84	-.08	223.59	7.75	-.85	569.	857.
10.000	.035	.024	1.03	228.04	3.63	.07	216.35	6.70	-.89	465.	854.
11.000	.015	.009	.89	222.38	3.95	.57	210.44	5.51	-1.27	399.	853.
12.000	.008	.004	.77	217.91	4.67	.11	205.57	5.01	-1.51	382.	844.
13.000	.005	.003	1.10	214.97	3.99	-.39	202.54	4.91	-1.49	254.	829.
14.000	.003	.002	.68	211.97	2.89	.06	200.45	3.17	-.14	52.	824.
15.000	.001	.001	1.33	208.37	2.71	.39	194.73	3.50	.84	17.	818.
16.000	99.999	99.999	999.99	205.52	2.96	.25	999.99	99.99	999.99	0.	816.
17.000	99.999	99.999	999.99	204.16	3.31	.03	999.99	99.99	999.99	0.	776.
18.000	99.999	99.999	999.99	204.23	3.62	-.21	999.99	99.99	999.99	0.	755.
19.000	99.999	99.999	999.99	206.35	3.07	-.05	999.99	99.99	999.99	0.	738.
20.000	99.999	99.999	999.99	209.02	2.61	-.08	999.99	99.99	999.99	0.	709.
21.000	99.999	99.999	999.99	211.37	2.44	-.06	999.99	99.99	999.99	0.	656.
22.000	99.999	99.999	999.99	213.43	2.55	.04	999.99	99.99	999.99	0.	634.
23.000	99.999	99.999	999.99	215.10	2.47	.07	999.99	99.99	999.99	0.	624.
24.000	99.999	99.999	999.99	216.55	2.60	.17	999.99	99.99	999.99	0.	630.
25.000	99.999	99.999	999.99	217.97	2.70	.14	999.99	99.99	999.99	0.	605.
26.000	99.999	99.999	999.99	219.41	2.86	.10	999.99	99.99	999.99	0.	586.
27.000	99.999	99.999	999.99	221.22	2.94	.44	999.99	99.99	999.99	0.	508.
28.000	99.999	99.999	999.99	222.94	3.33	.63	999.99	99.99	999.99	0.	502.
29.000	99.999	99.999	999.99	224.83	3.52	.53	999.99	99.99	999.99	0.	396.
30.000	99.999	99.999	999.99	226.83	3.75	.19	999.99	99.99	999.99	0.	392.

TABLE III. 3 MOISTURE RELATED STATISTICAL PARAMETERS, MARCH
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	12.608	6.078	.12	289.03	6.24	-.61	281.64	8.52	-.68	842.	842.
.020	12.124	6.028	.19	288.64	6.35	-.59	280.97	8.67	-.63	944.	944.
1.000	7.884	4.837	.33	285.32	5.30	-.81	273.61	10.75	-.67	902.	945.
2.000	4.832	3.374	.56	281.04	4.34	-.95	266.25	11.53	-.72	845.	947.
3.000	2.844	2.154	.87	276.23	3.70	-.78	259.40	10.90	-.51	826.	947.
4.000	1.595	1.256	1.23	270.47	3.57	-.46	252.65	9.93	-.42	810.	947.
5.000	.993	.822	1.34	264.06	3.50	-.24	246.97	10.07	-.48	800.	945.
6.000	.592	.495	1.25	257.34	3.43	-.16	241.41	9.61	-.40	795.	942.
7.000	.331	.271	1.31	250.39	3.50	-.22	235.79	8.64	-.29	797.	942.
8.000	.177	.140	1.17	243.13	3.56	-.25	230.00	7.88	-.23	745.	937.
9.000	.084	.063	1.34	235.68	3.56	-.22	223.71	6.97	-.33	649.	934.
10.000	.036	.025	1.26	228.32	3.43	.04	215.68	5.86	-.30	506.	933.
11.000	.016	.010	1.25	221.93	3.29	.43	210.91	4.91	-.61	438.	926.
12.000	.008	.004	1.58	217.06	3.82	.34	205.76	4.45	-.97	425.	923.
13.000	.005	.003	1.24	214.42	3.49	-.14	202.30	5.17	-1.14	277.	909.
14.000	.003	.002	.89	211.80	2.93	-.20	197.82	5.05	-.75	93.	904.
15.000	.002	.001	.60	208.66	2.70	.02	195.72	4.12	-.63	22.	899.
16.000	99.999	99.999	999.99	206.21	2.92	-.05	999.99	99.99	999.99	0.	892.
17.000	99.999	99.999	999.99	205.00	3.19	-.21	999.99	99.99	999.99	0.	850.
18.000	99.999	99.999	999.99	205.20	3.43	-.19	999.99	99.99	999.99	0.	837.
19.000	99.999	99.999	999.99	207.23	3.17	-.16	999.99	99.99	999.99	0.	830.
20.000	99.999	99.999	999.99	209.97	2.93	-.01	999.99	99.99	999.99	0.	804.
21.000	99.999	99.999	999.99	212.63	2.90	-.10	999.99	99.99	999.99	0.	746.
22.000	99.999	99.999	999.99	214.88	2.87	-.19	999.99	99.99	999.99	0.	739.
23.000	99.999	99.999	999.99	216.71	2.91	-.12	999.99	99.99	999.99	0.	725.
24.000	99.999	99.999	999.99	218.42	3.11	-.01	999.99	99.99	999.99	0.	729.
25.000	99.999	99.999	999.99	219.89	3.32	-.02	999.99	99.99	999.99	0.	719.
26.000	99.999	99.999	999.99	221.43	3.54	.12	999.99	99.99	999.99	0.	693.
27.000	99.999	99.999	999.99	223.11	3.67	.30	999.99	99.99	999.99	0.	608.
28.000	99.999	99.999	999.99	224.91	3.77	.27	999.99	99.99	999.99	0.	596.
29.000	99.999	99.999	999.99	225.80	3.70	.13	999.99	99.99	999.99	0.	470.
30.000	99.999	99.999	999.99	228.99	3.61	-.07	999.99	99.99	999.99	0.	464.

TABLE III. 4 MOISTURE RELATED STATISTICAL PARAMETERS, APRIL
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	16.471	5.827	-.19	293.96	5.42	-.89	286.56	6.44	-1.02	809.	809.
.020	16.218	5.882	-.16	293.66	5.53	-.86	286.28	6.56	-.97	893.	893.
1.000	9.427	4.767	.07	289.22	3.64	-.96	277.09	9.17	-.96	864.	895.
2.000	5.165	3.388	.46	284.17	3.46	-.62	267.50	11.02	-.76	813.	895.
3.000	2.792	2.060	.96	278.99	3.33	-.42	259.42	10.52	-.56	787.	894.
4.000	1.674	1.246	1.20	272.96	3.12	-.39	253.36	10.02	-.71	783.	894.
5.000	1.116	.849	.99	266.26	2.99	-.39	248.39	10.31	-.75	776.	894.
6.000	.644	.531	1.20	259.52	2.91	-.51	242.17	10.04	-.61	752.	892.
7.000	.353	.293	1.27	252.70	3.03	-.51	236.13	9.37	-.56	762.	892.
8.000	.189	.150	1.20	245.49	3.16	-.48	230.34	8.64	-.64	746.	892.
9.000	.092	.068	1.01	237.99	3.12	-.28	224.03	7.99	-.80	691.	889.
10.000	.039	.028	1.24	230.30	2.95	.07	217.10	7.04	-.89	514.	868.
11.000	.016	.011	1.21	223.03	2.65	.19	210.24	6.49	-1.12	448.	885.
12.000	.007	.004	1.13	216.77	2.95	.68	204.11	5.76	-1.12	444.	863.
13.000	.004	.003	.76	213.20	3.49	.28	199.60	6.08	-.81	309.	868.
14.000	.002	.002	.84	211.26	3.38	-.35	196.49	6.45	-.53	116.	860.
15.000	.002	.002	.71	208.77	2.90	-.11	196.24	6.[illegible]7	-.43	22.	855.
16.000	99.999	99.999	999.99	206.37	2.77	-.01	999.99	99.99	999.99	0.	851.
17.000	99.999	99.999	999.99	204.93	2.89	-.09	999.99	99.99	999.99	0.	826.
18.000	99.999	99.999	999.99	204.75	3.06	-.08	999.99	99.99	999.99	0.	820.
19.000	99.999	99.999	999.99	206.87	2.75	-.14	999.99	99.99	999.99	0.	810.
20.000	99.999	99.999	999.99	210.02	2.37	.00	999.99	99.99	999.99	0.	793.
21.000	99.999	99.999	999.99	213.04	2.36	-.18	999.99	99.99	999.99	0.	748.
22.000	99.999	99.999	999.99	215.62	2.31	-.23	999.99	99.99	999.99	0.	745.
23.000	99.999	99.999	999.99	217.79	2.16	-.22	999.99	99.99	999.99	0.	726.
24.000	99.999	99.999	999.99	219.85	2.22	-.12	999.99	99.99	999.99	0.	731.
25.000	99.999	99.999	999.99	221.76	2.28	-.34	999.99	99.99	999.99	0.	723.
26.000	99.999	99.999	999.99	223.65	2.32	-.27	999.99	99.99	999.99	0.	594.
27.000	99.999	99.999	999.99	225.65	2.41	-.25	999.99	99.99	999.99	0.	614.
28.000	99.999	99.999	999.99	227.65	2.48	-.21	999.99	99.99	999.99	0.	602.
29.000	99.999	99.999	999.99	229.59	2.71	-.01	999.99	99.99	999.99	0.	510.
30.000	99.999	99.999	999.99	231.47	2.67	-.06	999.99	99.99	999.99	0.	506.

TABLE III. 5 MOISTURE RELATED STATISTICAL PARAMETERS, MAY
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	19.758	5.372	-.53	297.75	4.97	-.57	289.83	5.04	-1.27	908.	908.
.020	19.429	5.429	-.50	297.45	4.91	-.54	289.53	5.16	-1.21	951.	952.
1.000	11.505	4.105	-.25	292.16	2.93	-.83	281.12	6.39	-1.16	941.	952.
2.000	6.742	3.246	-.13	285.92	2.55	-.78	272.49	8.75	-1.09	910.	953.
3.000	3.459	2.111	.57	280.26	2.46	-.19	263.03	9.20	-.70	885.	953.
4.000	2.004	1.380	1.03	274.13	2.42	-.27	256.17	8.65	-.25	861.	953.
5.000	1.242	.927	1.12	267.70	2.33	-.42	250.24	8.82	-.18	849.	953.
6.000	.700	.550	1.24	261.10	2.44	-.51	243.73	8.78	-.30	807.	950.
7.000	.394	.308	1.19	254.38	2.56	-.69	237.77	8.45	-.39	807.	949.
8.000	.210	.163	1.13	247.22	2.78	-.73	231.63	8.13	-.48	786.	948.
9.000	.102	.076	1.11	239.66	2.83	-.64	225.27	7.40	-.58	747.	946.
10.000	.042	.030	1.20	231.86	2.72	-.46	217.80	6.78	-.74	506.	943.
11.000	.017	.011	1.11	224.35	2.47	-.15	210.90	5.94	-.89	451.	941.
12.000	.007	.004	.97	217.52	2.79	.19	204.46	5.09	-1.08	449.	938.
13.000	.003	.002	1.90	212.52	2.97	.51	199.43	5.13	-.66	344.	931.
14.000	.002	.002	.99	210.36	3.48	.04	197.26	5.52	-.53	215.	927.
15.000	.002	.001	.96	208.89	3.01	-.13	196.94	3.74	.12	30.	924.
16.000	99.999	99.999	999.99	207.25	2.66	-.02	999.99	99.99	999.99	0.	919.
17.000	99.999	99.999	999.99	206.34	2.55	.11	999.99	99.99	999.99	0.	893.
18.000	99.999	99.999	999.99	206.52	2.75	-.02	999.99	99.99	999.99	0.	891.
19.000	99.999	99.999	999.99	208.87	2.59	-.11	999.99	99.99	999.99	0.	883.
20.000	99.999	99.999	999.99	212.03	2.17	-.09	999.99	99.99	999.99	0.	870.
21.000	99.999	99.999	999.99	214.95	1.90	-.21	999.99	99.99	999.99	0.	838.
22.000	99.999	99.999	999.99	217.45	1.86	-.32	999.99	99.99	999.99	0.	835.
23.000	99.999	99.999	999.99	219.52	1.78	-.33	999.99	99.99	999.99	0.	818.
24.000	99.999	99.999	999.99	221.48	1.86	-.16	999.99	99.99	999.99	0.	818.
25.000	99.999	99.999	999.99	223.40	1.87	-.20	999.99	99.99	999.99	0.	825.
26.000	99.999	99.999	999.99	225.23	1.89	-.09	999.99	99.99	999.99	0.	797.
27.000	99.999	99.999	999.99	227.15	2.00	-.12	999.99	99.99	999.99	0.	716.
28.000	99.999	99.999	999.99	228.87	2.00	-.22	999.99	99.99	999.99	0.	699.
29.000	99.999	99.999	999.99	230.3.	2.17	.06	999.99	99.99	999.99	0.	617.
30.000	99.999	99.999	999.99	232.37	2.14	-.08	999.99	99.99	999.99	0.	609.

TABLE III. 6 MOISTURE RELATED STATISTICAL PARAMETERS, JUNE
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	23.683	4.556	-.71	301.02	3.92	-.25	293.05	3.53	-1.53	829.	829.
.020	23.488	4.554	-.72	300.87	3.91	-.29	292.91	3.56	-1.52	845.	845.
1.000	15.036	3.451	-.54	295.23	2.14	-.16	285.79	4.01	-1.32	842.	848.
2.000	9.430	2.923	-.59	288.22	1.89	-.06	278.41	5.82	-1.78	831.	848.
3.000	5.399	2.228	-.23	282.17	1.72	.22	270.05	7.14	-1.13	792.	848.
4.000	3.158	1.663	.24	276.18	1.66	.19	262.47	7.91	-.55	769.	848.
5.000	1.827	1.191	.59	270.33	1.79	.06	254.94	9.01	-.42	753.	848.
6.000	.999	.710	.98	264.13	1.93	.17	247.86	8.78	-.43	742.	846.
7.000	.547	.418	1.19	257.67	2.04	.08	241.26	8.40	-.25	729.	844.
8.000	.298	.231	1.23	250.86	2.27	.01	235.06	8.17	-.33	718.	842.
9.000	.147	.112	1.42	243.59	2.46	.02	228.52	7.57	-.49	714.	839.
10.000	.067	.052	1.53	235.90	2.52	.05	221.62	7.26	-.61	537.	838.
11.000	.026	.020	1.37	228.01	2.41	.15	214.15	6.40	-.64	451.	834.
12.000	.010	.007	1.45	220.57	2.31	.10	207.23	5.56	-.91	453.	831.
13.000	.004	.003	1.72	213.99	2.30	.18	200.77	5.29	-.88	376.	818.
14.000	.002	.001	1.14	209.31	2.57	.30	196.27	5.13	-.44	232.	817.
15.000	.001	.001	1.27	206.32	2.94	-.02	194.47	4.26	-.46	26.	813.
16.000	99.999	99.999	999.99	204.81	2.85	.01	999.99	99.99	999.99	0.	811.
17.000	99.999	99.999	999.99	204.94	2.68	-.04	999.99	99.99	999.99	0.	783.
18.000	99.999	99.999	999.99	206.93	2.39	-.09	999.99	99.99	999.99	0.	782.
19.000	99.999	99.999	999.99	210.08	1.87	-.15	999.99	99.99	999.99	0.	776.
20.000	99.999	99.999	999.99	212.99	1.59	-.09	999.99	99.99	999.99	0.	770.
21.000	99.999	99.999	999.99	215.51	1.60	-.10	999.99	99.99	999.99	0.	742.
22.000	99.999	99.999	999.99	217.83	1.57	-.33	999.99	99.99	999.99	0.	739.
23.000	99.999	99.999	999.99	219.91	1.53	-.25	999.99	99.99	999.99	0.	717.
24.000	99.999	99.999	999.99	221.85	1.61	-.15	999.99	99.99	999.99	0.	715.
25.000	99.999	99.999	999.99	223.80	1.59	-.08	999.99	99.99	999.99	0.	720.
26.000	99.999	99.999	999.99	225.63	1.60	-.13	999.99	99.99	999.99	0.	693.
27.000	99.999	99.999	999.99	227.41	1.83	-.04	999.99	99.99	999.99	0.	617.
28.000	99.999	99.999	999.99	229.08	1.68	-.10	999.99	99.99	999.99	0.	600.
29.000	99.999	99.999	999.99	230.69	1.86	-.14	999.99	99.99	999.99	0.	509.
30.000	99.999	99.999	999.99	232.34	1.84	-.15	999.99	99.99	999.99	0.	503.

TABLE III. 7 MOISTURE RELATED STATISTICAL PARAMETERS. JULY
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	26.427	3.747	-.71	302.37	3.57	-.01	294.99	2.52	-1.35	780.	780.
.020	26.275	3.713	-.72	302.26	3.54	-.01	294.89	2.51	-1.36	783.	785.
1.000	17.224	[illegible]	-.59	296.41	1.62	-.16	288.12	2.68	[illegible]	784.	789.
2.000	10.775	2.709	-.94	288.57	1.37	-.28	280.64	4.77	-2.18	785.	789.
3.000	6.523	2.232	-.58	283.27	1.23	-.07	273.02	6.25	-1.63	775.	788.
4.000	4.070	1.623	-.36	277.25	1.33	.04	266.35	6.99	-1.47	757.	787.
5.000	2.474	1.226	.09	271.49	1.37	.03	259.49	7.94	-1.19	738.	785.
6.000	1.411	.804	.51	265.61	1.49	.01	252.51	7.94	-.84	704.	785.
7.000	.776	.479	.69	259.36	1.56	-.15	245.65	7.80	-.68	694.	783.
8.000	.403	.263	.89	252.81	1.67	-.35	238.63	7.70	-.75	684.	780.
9.000	.200	.135	1.15	245.72	1.86	-.33	231.83	7.03	-.55	663.	779.
10.000	.089	.062	1.58	238.03	1.96	-.26	224.51	6.54	-.54	532.	774.
11.000	.039	.027	1.75	230.03	1.95	-.16	217.73	5.83	-.48	440.	773.
12.000	.014	.010	2.14	222.06	1.87	-.17	210.09	5.07	-.47	439.	772.
13.000	.005	.004	2.14	214.51	1.85	.01	202.70	5.08	-.54	323.	758.
14.000	.002	.002	1.58	208.38	1.96	.44	197.14	5.17	-.52	196.	755.
15.000	.001	.000	.49	204.61	2.54	.50	193.59	2.71	-.17	33.	744.
16.000	99.999	99.999	999.99	203.82	2.64	.28	999.99	99.99	999.99	0.	735.
17.000	99.999	99.999	999.99	205.07	2.47	-.04	999.99	99.99	999.99	0.	710.
18.000	99.999	99.999	999.99	207.79	2.15	-.17	999.99	99.99	999.99	0.	708.
19.000	99.999	99.999	999.99	210.79	1.81	.21	999.99	99.99	999.99	0.	701.
20.000	99.999	99.999	999.99	213.60	1.67	.21	999.99	99.99	999.99	0.	696.
21.000	99.999	99.999	999.99	215.98	1.74	-.17	999.99	99.99	999.99	0.	674.
22.000	99.999	99.999	999.99	217.91	1.59	-.23	999.99	99.99	999.99	0.	664.
23.000	99.999	99.999	999.99	219.76	1.60	-.54	999.99	99.99	999.99	0.	656.
24.000	99.999	99.999	999.99	221.66	1.71	-.31	999.99	99.99	999.99	0.	653.
25.000	99.999	99.999	999.99	223.42	1.65	-.15	999.99	99.99	999.99	0.	646.
26.000	99.999	99.999	999.99	225.07	1.68	-.30	999.99	99.99	999.99	0.	615.
27.000	99.999	99.999	999.99	226.75	2.00	.13	999.99	99.99	999.99	0.	585.
28.000	99.999	99.999	999.99	228.41	1.73	-.15	999.99	99.99	999.99	0.	568.
29.000	99.999	99.999	999.99	230.05	2.11	.08	999.99	99.99	999.99	0.	500.
30.000	99.999	99.999	999.99	231.45	1.96	-.34	999.99	99.99	999.99	0.	477.

TABLE III. 8 MOISTURE RELATED STATISTICAL PARAMETERS. AUGUST
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	25.988	3.663	.15	301.97	3.64	.25	294.72	2.41	-.94	826.	826.
.020	25.815	3.648	.07	301.83	3.62	.23	294.61	2.43	-1.02	828.	828.
1.000	17.447	2.794	-.64	296.24	1.65	-.07	288.31	2.73	-1.34	827.	829.
2.000	11.013	2.554	-.97	289.46	1.51	-.71	281.07	4.30	-2.18	827.	829.
3.000	6.631	2.206	.72	283.34	1.37	[illegible]	273.25	6.37	-1.99	813.	828.
4.000	4.124	1.681	-.43	277.40	1.41	-.34	266.37	7.58	-1.84	791.	[illegible]
5.000	2.456	1.258	.06	271.59	1.41	-.43	259.24	8.29	-1.17	779.	826.
6.000	1.388	.833	.40	265.64	1.46	[illegible]	251.92	8.85	-.98	737.	825.
7.000	.778	.504	.56	259.35	1.53	[illegible]	[illegible]	8.92	-.90	734.	822.
8.000	.417	.282	.79	252.75	1.69	-.87	[illegible]	8.64	-.93	723.	818.
9.000	.200	.139	.82	245.63	1.83	-.68	231.34	8.14	-.82	712	817.
10.000	.086	.062	.97	[illegible]	1.85	[illegible]	223.62	7.75	-.85	551.	814.
11.000	.037	.025	.92	229.97	1.78	.11	216.82	7.12	-1.03	453.	810.
12.000	.014	.009	.98	222.14	1.68	.33	209.44	6.07	-1.22	450.	808.
13.000	.005	.003	1.34	214.71	1.91	.50	202.19	5.91	-1.19	371.	[illegible]
14.000	.002	.002	4.14	208.55	2.36	.71	196.54	5.67	-.78	214.	796.
15.000	.002	.003	3.46	204.82	2.67	.50	193.79	7.76	-.96	22.	795.
16.000	99.999	99.999	999.99	204.09	2.47	[illegible]	999.99	99.99	999.99	0.	787.
17.000	99.999	99.999	999.99	205.35	2.22	[illegible]	999.99	99.99	999.99	0.	758.
18.000	99.999	99.999	999.99	207.93	2.00	-.22	999.99	99.99	999.99	0.	756.
19.000	99.999	99.999	999.99	210.84	1.73	-.12	999.99	99.99	999.99	0.	751.
20.000	99.999	99.999	999.99	213.47	1.55	-.07	999.99	99.99	999.99	0.	744.
21.000	99.999	99.999	999.99	215.66	1.54	-.16	999.99	99.99	999.99	0.	725.
22.000	99.999	99.999	999.99	217.52	1.50	-.14	999.99	99.99	999.99	0.	714.
23.000	99.999	99.999	999.99	219.29	1.50	-.11	999.99	99.99	999.99	0.	694.
24.000	99.999	99.999	999.99	221.03	1.55	-.07	999.99	99.99	999.99	0.	694.
25.000	99.999	99.999	999.99	222.76	1.57	-.17	999.99	99.99	999.99	0.	688.
26.000	99.999	99.999	999.99	[illegible]	[illegible]	-.16	999.99	99.99	999.99	0.	661
27.000	99.999	99.999	999.99	225.96	1.83	-.03	999.99	99.99	999.99	0.	620.
28.000	99.999	99.999	999.99	227.58	1.71	-.16	999.99	99.99	999.99	0.	590.
29.000	99.999	99.999	999.99	229.14	2.14	.04	999.99	99.99	999.99	0.	511.
30.000	99.999	99.999	999.99	230.60	2.01	-.17	999.99	99.99	999.99	0.	495.

TABLE III. 9 MOISTURE RELATED STATISTICAL PARAMETERS, SEPTEMBER
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	23.104	5.000	-.72	300.32	4.29	-.38	292.56	4.05	-1.63	724.	724.
.020	22.786	5.105	-.75	300.15	4.29	-.41	292.30	4.25	-1.70	746.	747.
1.000	15.740	3.594	-.73	294.94	2.17	-.70	286.47	4.19	-1.78	741.	746.
2.000	9.919	3.198	-.77	288.46	1.75	-.68	279.00	6.40	-1.90	725.	746.
3.000	5.709	2.655	-.18	282.96	1.56	-.27	270.30	8.60	-1.38	669.	746.
4.000	3.498	1.955	.14	277.39	1.54	-.05	263.25	9.31	-.97	662.	746.
5.000	2.144	1.395	.53	271.35	1.71	-.06	256.72	9.55	-.69	648.	746.
6.000	1.265	.905	.75	265.51	1.89	.11	250.24	9.43	-.45	632.	745.
7.000	.703	.534	1.02	258.97	2.06	-.10	243.75	8.86	-.25	631.	744.
8.000	.377	.305	1.12	252.12	2.25	-.28	237.08	8.69	-.16	632.	741.
9.000	.192	.151	1.06	244.84	2.41	-.21	230.63	8.29	-.38	623.	739.
10.000	.088	.069	1.15	237.20	2.42	-.05	223.77	7.54	-.37	517.	739.
11.000	.036	.028	1.51	229.28	2.19	.10	216.60	6.33	-.26	456.	737.
12.000	.013	.009	1.66	221.73	1.90	.26	209.18	5.31	-.60	447.	737.
13.000	.005	.003	1.52	214.74	1.88	.26	202.28	5.27	-.86	338.	723.
14.000	.002	.001	.74	208.79	2.08	.08	195.64	4.93	-.75	225.	722.
15.000	.001	.001	.68	204.43	2.38	.10	193.27	3.66	-.12	40.	718.
16.000	99.999	99.999	999.99	202.73	2.78	-.02	999.99	99.99	999.99	0.	710.
17.000	99.999	99.999	999.99	203.54	2.95	.03	999.99	99.99	999.99	0.	680.
18.000	99.999	99.999	999.99	[illegible]	2.72	-.15	999.99	99.99	999.99	0.	673.
19.000	99.999	99.999	999.99	[illegible]	2.09	-.03	999.99	99.99	999.99	0.	664.
20.000	99.999	99.999	999.99	[illegible]	1.68	-.14	999.99	99.99	999.99	0.	657.
21.000	99.999	99.999	999.99	[illegible]	1.66	-.16	999.99	99.99	999.99	0.	639.
22.000	99.999	99.999	999.99	[illegible]	.53	-.37	999.99	99.99	999.99	0.	635.
23.000	99.999	99.999	999.99	218.86	.50	-.22	999.99	99.99	999.99	0.	618.
24.000	99.999	99.999	999.99	220.65	1.69	-.05	999.99	99.99	999.99	0.	617.
25.000	99.999	99.999	999.99	222.34	1.65	-.10	999.99	99.99	999.99	0.	613.
26.000	99.999	99.999	999.99	223.84	1.69	-.10	999.99	99.99	999.99	0.	586.
27.000	99.999	99.999	999.99	225.25	1.82	-.01	999.99	99.99	999.99	0.	544.
28.000	99.999	99.999	999.99	226.76	1.76	-.09	999.99	99.99	999.99	0.	534.
29.000	99.999	99.999	999.99	228.24	2.03	-.03	999.99	99.99	999.99	0.	456.
30.000	99.999	99.999	999.99	229.75	1.93	-.19	999.99	99.99	999.99	0.	449.

TABLE III. 10 MOISTURE RELATED STATISTICAL PARAMETERS, OCTOBER
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	16.580	6.231	-.01	294.87	5.03	-.50	285.56	6.70	-.83	766.	766.
.020	16.274	6.199	.02	294.61	6.03	-.51	286.25	6.75	-.80	815.	815.
1.000	11.139	4.956	-.16	290.20	3.65	-.90	279.88	8.62	-1.34	803.	819.
2.000	6.221	3.897	.33	285.54	2.68	-.71	270.23	10.75	-.68	771.	820.
3.000	3.613	2.610	.77	280.63	2.50	-.35	262.78	10.35	-.30	714.	820.
4.000	2.081	1.742	1.28	275.30	2.51	-.41	255.55	10.25	-.13	672.	819.
5.000	1.222	1.131	1.69	269.42	2.64	-.42	249.10	10.10	-.13	659.	819.
6.000	.719	.684	1.93	262.80	2.88	-.12	243.26	9.69	-.18	670.	817.
7.000	.423	.404	1.89	255.82	3.04	-.19	237.68	9.46	-.23	673.	817.
8.000	.227	.221	2.02	248.69	3.28	-.11	231.65	9.84	-.15	676.	806.
9.000	.119	.111	1.92	241.31	3.39	-.03	225.80	8.40	-.30	663.	803.
10.000	.054	.052	1.87	233.84	3.32	.11	218.91	8.16	-.23	514.	795.
11.000	.023	.021	2.09	226.52	2.84	.01	212.28	7.31	-.49	457.	789.
12.000	.009	.007	1.[illegible]	219.87	2.44	-.12	206.16	6.25	-.87	457.	786.
13.000	.004	.003	1.78	213.95	2.06	-.18	200.37	5.81	-1.10	337.	775.
14.000	.002	.001	.40	208.88	2.25	.11	195.69	5.07	-.67	190.	771.
15.000	.001	.001	1.91	204.96	2.56	.04	192.91	3.37	.66	33.	768.
16.000	99.999	99.999	999.99	202.89	2.93	-.08	999.99	99.99	999.99	0.	756.
17.000	99.999	99.999	999.99	203.12	3.12	-.12	999.99	99.99	999.99	0.	727.
18.000	99.999	99.999	999.99	205.[illegible]	2.88	-.01	999.99	99.99	999.99	0.	719.
19.000	99.999	99.999	999.99	208.67	2.37	-.07	999.99	99.99	999.99	0.	711.
20.000	99.999	99.999	999.99	211.57	2.01	-.10	999.99	99.99	999.99	0.	703.
21.000	99.999	99.999	999.99	213.91	1.94	.04	999.99	99.99	999.99	0.	675.
22.000	99.999	99.999	999.99	215.92	1.83	-.10	999.99	99.99	999.99	0.	673.
23.000	99.999	99.999	999.99	217.82	1.62	-.03	999.99	99.99	999.99	0.	667.
24.000	99.999	99.999	999.99	219.60	1.78	.04	999.99	99.99	999.99	0.	669.
25.000	99.999	99.999	999.99	221.22	1.78	.04	999.99	99.99	999.99	0.	657.
26.000	99.999	99.999	999.99	222.72	1.88	.18	999.99	99.99	999.99	0.	652.
27.000	99.999	99.999	999.99	224.11	2.08	.16	999.99	99.99	999.99	0.	608.
28.000	99.999	99.999	999.99	225.44	2.22	.18	999.99	99.99	999.99	0	602.
29.000	99.999	99.999	999.99	226.80	.42	.10	999.99	99.99	999.99	0.	506.
30.000	99.999	99.999	999.99	228.18	2.52	.11	999.99	99.99	999.99	0.	501.

TABLE III. 11 MOISTURE RELATED STATISTICAL PARAMETERS, NOVEMBER
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	12.786	5.898	.38	288.92	6.82	-.41	282.16	7.71	-.58	635.	635.
.020	12.406	5.794	.44	288.58	6.72	-.38	281.70	7.66	-.49	753.	753.
1.000	8.303	4.991	.24	286.27	4.70	-.99	274.35	10.84	-.76	712.	753.
2.000	4.786	3.067	.69	282.76	3.62	-1.35	265.46	12.43	-.56	635.	753.
3.000	2.979	2.360	1.01	278.32	3.36	-1.33	259.16	11.34	-.40	623.	753.
4.000	1.753	1.475	1.19	272.84	3.20	-.80	253.34	10.56	-.35	604.	751.
5.000	1.052	.937	1.53	266.83	3.18	-.81	247.52	9.98	-.28	594.	750.
6.000	.630	.555	1.66	260.20	3.21	-.72	242.26	9.06	-.17	597.	750.
7.000	.383	.324	1.53	253.36	3.26	-.78	237.30	8.52	-.20	608.	749.
8.000	.214	.175	1.37	245.16	3.34	-.70	231.68	8.16	-.27	623.	747.
9.000	.103	.078	1.34	238.71	3.21	-.32	225.33	7.30	-.48	602.	745.
10.000	.041	.031	1.53	231.15	3.02	-.01	217.66	6.62	-.62	475.	742.
11.000	.016	.011	1.57	223.98	2.71	.08	210.80	5.89	-1.07	435.	742.
12.000	.007	.004	1.68	217.50	2.70	.25	204.62	5.20	-1.31	428.	741.
13.000	.003	.002	3.05	212.17	2.86	.45	199.14	5.35	-.84	291.	730.
14.000	.002	.001	1.77	208.31	3.01	.27	195.30	4.42	-.10	121.	730.
15.000	.002	.002	1.79	205.48	2.89	.53	194.60	4.87	.88	16.	724.
16.000	99.999	99.999	999.99	203.51	3.02	.59	999.99	99.99	999.99	0.	712.
17.000	99.999	99.999	999.99	203.02	3.24	.62	999.99	99.99	999.99	0.	686.
18.000	99.999	99.999	999.99	204.11	3.49	.43	999.99	99.99	999.99	0.	674.
19.000	99.999	99.999	999.99	206.86	3.13	.15	999.99	99.99	999.99	0.	668.
20.000	99.999	99.999	999.99	209.66	2.74	.20	999.99	99.99	999.99	0.	655.
21.000	99.999	99.999	999.99	211.97	2.54	.03	999.99	99.99	999.99	0.	641.
22.000	99.999	99.999	999.99	214.04	2.51	.01	999.99	99.99	999.99	0.	639.
23.000	99.999	99.999	999.99	215.95	2.44	.01	999.99	99.99	999.99	0.	626.
24.000	99.999	99.999	999.99	217.88	2.71	.00	999.99	99.99	999.99	0.	615.
25.000	99.999	99.999	999.99	219.47	2.80	-.31	999.99	99.99	999.99	0.	613.
26.000	99.999	99.999	999.99	220.90	2.79	-.31	999.99	99.99	999.99	0.	602.
27.000	99.999	99.999	999.99	222.21	2.83	-.21	999.99	99.99	999.99	0.	566.
28.000	99.999	99.999	999.99	223.49	3.09	-.07	999.99	99.99	999.99	0.	563.
29.000	99.999	99.999	999.99	224.78	3.22	.16	999.99	99.99	999.99	0.	478.
30.000	99.999	99.999	999.99	226.27	3.21	.25	999.99	99.99	999.99	0.	474.

TABLE III. 12 MOISTURE RELATED STATISTICAL PARAMETERS, DECEMBER
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	11.053	6.294	.52	285.57	7.19	-.31	279.10	9.65	-.59	581.	681.
.020	10.602	6.190	.58	285.21	7.15	-.27	276.42	9.70	-.51	790.	791.
1.000	7.817	5.393	.26	284.03	5.58	-.58	272.28	12.87	-.63	729.	791.
2.000	4.859	3.676	.59	280.91	4.17	-.67	265.83	12.09	-.43	684.	793.
3.000	2.830	2.280	.96	276.66	3.71	-.54	259.14	10.95	-.30	648.	793.
4.000	1.694	1.417	1.22	271.29	3.50	-.53	253.12	10.09	-.14	626.	793
5.000	1.066	.931	1.26	265.16	3.51	-.40	247.50	10.35	-.31	618.	791.
6.000	.647	.579	1.29	258.61	3.44	-.36	241.95	10.12	-.33	618.	787.
7.000	.376	.331	1.32	251.71	3.60	-.45	236.51	9.41	-.34	628.	785.
8.000	.205	.172	1.34	244.45	3.72	-.46	231.08	3.50	-.32	640.	784.
9.000	.098	.076	1.15	236.90	3.73	-.47	224.69	7.64	-.45	639.	732.
10.000	.041	030	1.05	229.43	3.39	-.11	217 47	7.00	-.62	518.	778.
11.000	.016	.011	1.10	222 46	2.96	.35	210.56	6.19	-.90	459.	777.
12.000	.007	.004	.81	216.37	3.07	.62	204.80	5.65	-1.08	446.	777.
13.000	.004	.002	1.11	212.00	3.39	.38	200.16	5.64	-.95	318.	759.
14.000	.002	.002	1.16	209.06	3.35	-.02	196.50	5.65	-.78	97.	752.
15.000	.001	.000	-.31	206.39	2.86	.23	193.60	3.03	-.93	14.	742.
16.000	99.999	99.999	999.99	204.13	2.85	.46	999.99	99.99	999.99	0.	737.
17.000	99.999	99.999	999.99	203.06	3.15	.42	999.99	99.99	999.99	0.	704.
18.000	99.999	99.999	999.99	203.34	3.50	.24	999.99	99.99	999.99	0.	696.
19.000	99.999	99.999	999.99	205.48	3.30	.09	999.99	99.99	999.99	0.	684.
20.000	99.999	99.999	999.99	208.05	2.98	.15	999.99	99.99	999.99	0.	666.
21.000	99.999	99.999	999.99	210.60	2.74	.17	999.99	99.99	999.99	0.	642.
22.000	99.999	99.999	999.99	212.84	2.69	.24	999.99	99.99	999.99	0.	632.
23.000	99.999	99.999	999.99	214.68	2.75	.42	999.99	99.99	999.99	0.	625.
24.000	99.999	99.999	999.99	216.45	3.21	.69	999.99	99.99	999.99	0.	612.
25.000	99.999	99.999	999.99	218.26	3.94	1.07	999.99	99.99	999.99	0.	593.
26.000	99.999	99.999	999.99	219.94	4.27	1.00	999.99	99.99	999.99	0.	589.
27.000	99.999	99.999	999.99	221 70	4.50	.93	999.99	99.99	999.99	0.	550.
28.000	99.999	99.999	999.99	223.40	4.63	.65	999.99	99.99	999.99	0.	547.
29.000	99.999	99.999	999.99	224.99	4.50	.57	999.99	99.99	999.99	0.	439.
30.000	99.999	99.999	999.99	226.79	4.28	.26	999.99	99.99	999.99	0	451.

TABLE III. 13 MOISTURE RELATED STATISTICAL PARAMETERS. ANNUAL
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	VAPOR P MB	S.D. VP MB	SKEW VP	TV DEG K	TV DEG K	SKEW TV	DEWPT T DEG K	S.D. DPT DEG K	SKEW DPT	NOBS T+P	NOBS TV
.000	17.525	8.070	-.18	293.98	8.71	-.63	286.52	9.31	-1.09	9351.	9351.
.020	16.898	8.095	-.11	293.36	8.79	-.56	285.83	9.53	-1.00	10146.	10151.
1.000	11.242	5.810	-.20	289.48	6.59	-.84	279.07	10.84	-1.21	9934.	10169.
2.000	6.937	4.128	.02	284.42	4.95	-.90	271.54	11.52	-.98	9392.	10174.
3.000	4.031	2.725	.40	279.24	4.30	-.94	264.00	11.17	-.68	9043.	10171.
4.000	2.416	1.801	.72	273.52	4.12	-.85	257.36	10.82	-.49	8783	10165.
5.000	1.471	1.191	.99	267.43	4.24	-.71	251.19	10.71	-.42	8532.	10158.
6.000	.845	.720	1.26	260.98	4.43	-.56	244.96	10.20	-.36	9491.	10[illegible]33.
7.000	.477	.413	1.42	254.28	4.63	-.49	239.03	9.58	-.34	8515.	10116.
8.000	.256	.223	1.58	247.22	4.88	-.40	232.99	8.94	-.33	8392.	10076.
9.000	.127	.110	1.72	239.86	4.97	-.27	226.63	8.23	-.39	7946.	10049.
10.000	.055	.049	2.00	232.34	4.76	-.12	219.[illegible]2	7.65	-.37	6151.	10013.
11.000	.023	.020	2.24	225.15	4.17	-.05	212.65	6.79	-.49	5327.	9977.
12.000	.009	.007	2.17	218.74	3.68	-.19	206.36	5.92	-.79	5242.	9947.
13.000	.004	.003	1.76	213.72	3.15	-.06	201.02	5.59	-.89	3839.	9787.
14.000	.002	.002	1.71	209.90	3.14	.22	196.76	5.35	-.62	183[illegible].	9743.
15.000	.001	.001	3.89	206.76	3.24	.19	194.53	4.49	-.36	237.	9634.
16.000	99.999	99.999	999.99	204.82	3.15	.13	999.99	99.99	999.99	0.	9600.
17.000	99.999	99.999	999.99	204.42	3.12	-.04	999.99	99.99	999.99	0.	9234.
18.000	99.999	99.999	999.99	205.54	3.36	-.32	999.99	99.99	999.99	0.	9132.
19.000	99.999	99.999	999.99	208.09	3.28	-.45	999.99	99.99	999.99	0.	9022.
20.000	99.999	99.999	999.99	210.92	3.06	-.48	999.99	99.99	999.99	0.	8843.
21.000	99.999	99.999	999.99	213.45	2.95	-.49	999.99	99.99	999.99	0.	8458.
22.000	99.999	99.999	999.99	215.65	2.89	-.54	999.99	99.99	999.99	0.	8376.
23.000	99.999	99.999	999.99	217.54	2.91	-.55	999.99	99.99	999.99	0.	8214.
24.000	99.999	99.999	999.99	219.36	3.08	-.52	999.99	99.99	999.99	0.	8198.
25.000	99.999	99.999	999.99	221.09	3.25	-.55	999.99	99.99	999.99	0.	8111.
26.000	99.999	99.999	999.99	222.71	3.40	-.52	999.99	99.99	999.99	0.	7854.
27.000	99.999	99.999	999.99	224.38	3.55	-.41	999.99	99.99	999.99	0.	7166.
28.000	99.999	99.999	999.99	226.00	3.67	-.50	999.99	99.99	999.99	0.	7014.
29.000	99.999	99.999	999.99	227.70	3.77	-.42	999.99	99.99	999.99	0.	5904.
30.000	99.999	99.999	999.99	229.37	3.73	-.50	999.99	99.99	999.99	0.	5806.

JANUARY

TABLE IV. 1 HYDROSTATIC MODEL ATMOSPHERE. STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1019.9000	1250.0000	284.47
.020	.020	1017.5000	1248.0000	284.09
1.000	.999	904.2600	1114.0000	282.75
2.000	1.997	800.9100	997.8000	279.66
3.000	2.995	708.3600	896.8000	275.17
4.000	3.992	625.0700	807.3000	269.74
5.000	4.989	550.1200	726.7000	263.72
6.000	5.986	482.6800	654.0000	257.09
7.000	6.983	422.0500	587.5000	250.26
8.000	7.979	367.6400	527.1000	242.97
9.000	8.975	318.9000	471.8000	235.47
10.000	9.971	275 3700	420 6000	228.00
11.000	10.966	236.7100	372.1000	221.59
12.000	11.961	202.6900	326.1000	216.54
13.000	12.956	173.0000	282.4000	213.47
14.000	13.951	147.4600	243 3000	211.11
15.000	14.945	125.4000	210.1000	207.90
16.000	15.939	106.3900	180 6000	205.16
17.000	16.932	90.1150	154.0000	203.79
18.000	17.925	76.2920	130.4000	203.74
19.000	18.918	64.6350	109.6000	205.38
20.000	19.911	54.8500	91.9700	207.76
21.000	20.903	46.6380	77.2700	210.28
22.000	21.895	39.7320	65.1100	212.59
23.000	22.886	33.9020	55.0900	214.39
24.000	23.878	28.9670	46.6900	216.13
25.000	24.869	24.7800	39.6600	217.66
26.000	25.859	21.2230	33.7300	219.17
27.000	26.850	18.1970	28.7200	220.76
28.000	27.840	15.6220	24.4600	222.48
29.000	28.830	13.4260	20.8800	224.03
30.000	29.819	11.5533	17.8200	225.80

FEBRUARY

TABLE IV. 2 HYDROSTATIC MODEL ATMOSPHERE. STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1018.3000	1246.0000	284.78
.020	.020	1015.8000	1243.0000	284.81
1.000	.999	902.8200	1115 0000	282.03
2.000	1.997	799.4300	[illegible]	278.71
3.000	2.995	706.6900	897 8000	274.23
4.000	3.992	623.3100	808.1000	268.71
5.000	4.989	548.2600	727.5000	262.56
6.000	5.986	480.7900	654 2000	255.04
7.000	6.983	420.1700	587.3000	249.21
8.000	7.979	365.8000	526.5000	242.04
9.000	8.975	317.1500	470.5000	234.83
10.000	9.971	273.8000	418.3000	228 04
11.000	10.966	235.4300	368.8000	222.38
12.000	11.961	201.7400	322.5000	217.91
13.000	12.956	172.4300	279.4000	214.97
14.000	13.951	147.0800	241 7000	211.97
15.000	14.945	125.1100	209.2000	208.37
16.000	15.939	106.1800	180.0000	205.52
17.000	16.932	89.9690	153.5000	204 16
18.000	17.925	76.1950	130.0000	204.23
19.000	18.918	64.5910	109.0000	206.35
20.000	19.911	54.8610	91.4400	209.02
21.000	20.903	[illegible]	76.9500	211.37
22.000	21.895	39.8050	64.9600	213.48
23.000	22.886	33.9650	55.0400	215.10
24.000	23 878	29.0490	46.7300	216.55
25.000	24.869	24.8580	39.7300	217.97
26.000	25.859	21.2930	33.8100	219.41
27.000	26.850	18.2620	28.7600	221.22
28.000	27.840	15.6820	24.5000	222.94
29.000	28.830	13.4840	20.8900	224.83
30.000	29.819	11.6103	17.8300	[illegible]

MARCH

TABLE IV. 3 HYDROSTATIC MODEL ATMOSPHERE. STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1016.9000	1226.0000	289.03
.020	.020	1014.5000	1224.0000	288.64
1.000	.999	902.9300	1102 0000	285.32
2.000	1.997	800.4800	992.2000	281.04
3.000	2.995	708.3000	893.3000	276.23
4.000	3.992	625.2700	805.3000	270.47
5.000	4.989	550.4400	726.2000	264.05
6.000	5.986	483.0300	653.9000	257.34
7.000	6.983	422.4000	587.7000	250.39
8.000	7.979	367.9800	527.3000	243.13
9.000	8.975	319.2200	471.9000	235.69
10.000	9.971	275.6900	420.6000	228.33
11 000	10.966	237.0400	372 1000	221.93
12.000	11.951	203.0300	325.9000	217.06
13.000	12.956	173.4400	281.8000	214.42
14.000	13.951	147.8000	243.2000	211 80
15.000	14.945	125.6200	210.1000	[illegible]
16 000	15.939	106.8200	180.5000	206.21
17.000	16.932	90.5670	153.9000	205.00
18.000	17.925	76.7580	130 3000	205.20
19.000	18 913	65.1160	109.5000	207.23
20.000	19 911	[illegible]	91.8300	209.37
21.000	20.903	[illegible]	77.2400	212.63
22.000	21.895	[illegible]	65.2200	214.83
23.000	22.886	[illegible]	55.2600	216.71
24.000	23.878	29.4300	46.9400	218 42
25.000	24.869	25 2170	39 9500	219.89
26.000	25.859	21.6310	34 0300	221.43
27.000	26.850	18.5770	29 0100	223.11
28 000	27.840	15.9730	24.7400	224 91
29 000	28.830	13.7520	21 1200	226.90
30 000	29 819	11.8571	18.0400	228.39

APRIL

TABLE IV. 4 HYDROSTATIC MODEL ATMOSPHERE. STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1016.5000	1205.0000	293.96
.020	.020	1014.1000	1203.0000	293.66
1.000	.999	904.2100	1089.0000	289.22
2.000	1.997	802.8100	964.2000	284.17
3.000	2.995	711.2700	888.1000	278.99
4.000	3.992	628.6400	802.3000	272.96
5.000	4.989	554.0200	724.9000	266.26
6.000	5.986	486.7000	653.3000	259 52
7.000	6.983	426.1100	587.4000	252.70
8.000	7.979	371.6900	527.4000	245.49
9.000	8.975	322.8800	472.6000	237.99
10.000	9.971	279.2200	422.4000	230.30
11.000	10.966	240.3200	375.4000	223.03
12.000	11.961	205.9000	330.9000	216 77
13.000	12.956	175.8000	287.2000	213.20
14.000	13.951	149.7300	247.0000	211 26
15.000	14.945	127.4200	212.6000	208.77
16 000	15.939	108.2000	182.6000	206.37
17.000	16.932	91.7360	153.9000	204.93
18.000	17.925	77.7320	132.3000	204.75
19.000	18.918	65.9210	111.0000	206.87
20.000	19.911	56.0240	92.9300	210.02
21.000	20.903	47.7280	78.0500	213.04
22.000	21.895	40.7460	65.8400	215.62
23.000	22.886	34.8510	55.7500	217.79
24.000	23.878	29.8540	47.3000	219.85
25.000	24 869	25.6100	40.2300	221.76
26.000	25.859	21.9990	34.2700	223.65
27.000	26.850	18.9230	29.2100	225 65
28.000	27.840	16.3000	24.9400	227 65
29.000	28.830	[illegible]	21.3300	[illegible]
30.000	29.819	12.1424	[illegible]	[illegible]

MAY

TABLE IV. 5 HYDROSTATIC MODEL ATMOSPHERE.
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1015.3000	1188.0000	297.75
.020	.020	1012.9000	1186.0000	297.45
1.000	.999	904.3400	1078.0000	292.16
2.000	1.997	803.6900	979.2000	285.92
3.000	2.995	712.5100	885.5000	280.26
4.000	3.992	630.0800	800.7000	274.13
5.000	4.989	555.6200	723.1000	267.70
6.000	5.986	488.4700	651.7000	261.10
7.000	6.983	426.0200	566.2000	254.39
8.000	7.979	373.7000	526.6000	247.22
9.000	8.975	324.9[illegible]00	472.4000	239.66
10.000	9.971	281.2900	422.5000	231.86
11.000	10.966	242.3300	376.3000	224.35
12.000	11.961	207.7700	332.8000	217.52
13.000	12.956	177.4000	290.8000	212.52
14.000	13.951	151.0700	250.2000	210.36
15.000	14.945	128.4700	214.3000	208.83
16.000	15.939	109.1300	183.4000	207.26
17.000	16.932	92.6110	156.4000	206.34
18.000	17.925	78.5740	132.5000	206.52
19.000	18.918	66.7350	111.3000	208.87
20.000	19.911	56.8040	93.3300	212.03
21.000	20.903	48.4640	78.5400	214.95
22.000	21.895	41.4330	66.3800	217.45
23.000	22.886	35.4820	56.3100	219.52
24.000	23.878	30.4300	47.8600	221.48
25.000	24.869	26.1340	40.7500	223.40
26.000	25.859	22.4740	34.7500	225.29
27.000	26.850	19.3520	29.6800	227.15
28.000	27.840	16.6840	25.4000	228.87
29.000	28.830	14.4010	21.7500	230.63
30.000	29.819	12.4454	18.6600	232.37

JUNE

TABLE IV. 6 HYDROSTATIC MODEL ATMOSPHERE.
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1014.6000	1174.0000	301.02
.020	.020	1012.3000	1172.0000	300.87
1.000	.999	904.8300	1068.0000	295.23
2.000	1.997	805.0500	973.0000	288.22
3.000	2.995	714.3400	881.9600	282.17
4.000	3.992	632.2500	797.5000	276.18
5.000	4.989	558.1400	719.3000	270.33
6.000	5.986	491.3500	648.0000	264.13
7.000	6.983	431.2400	583.0000	257.67
8.000	7.979	377.2100	523.3000	250.86
9.000	8.975	328.7100	470.1000	243.59
10.000	9.971	285.2300	421.2000	235.90
11.000	10.966	246.3300	376.4000	228.01
12.000	11.961	211.6900	334.3000	220.57
13.000	12.956	181.0400	294.7000	213.99
14.000	13.951	154.1900	256.6000	209.31
15.000	14.945	130.9400	221.1000	205.32
16.000	15.939	111.0100	188.8000	204.81
17.000	16.932	94.0600	159.9000	204.94
18.000	17.925	79.7720	134.3000	206.93
19.000	18.918	67.7950	112.4000	210.08
20.000	19.911	57.7540	94.4600	212.99
21.000	20.903	49.3030	79.7000	215.51
22.000	21.895	42.1640	67.4300	217.83
23.000	22.886	36.1180	57.2200	219.91
24.000	23.878	30.9840	48.6500	221.85
25.000	24.869	26.6160	41.4300	223.80
26.000	25.859	22.8950	35.3500	225.63
27.000	26.850	19.7180	30.2100	227.41
28.000	27.840	17.0020	25.8500	229.08
29.000	28.830	14.8[illegible]70	22.1600	230.69
30.000	29.819	12.6841	19.0200	232.34

JULY

TABLE IV. 7 HYDROSTATIC MODEL ATMOSPHERE.
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1016.0000	1171.0000	302.37
.020	.020	1013.7000	1168.0000	302.25
1.000	.999	906.6100	1066.0000	296.41
2.000	1.997	807.0000	970.9000	289.57
3.000	2.995	716.4400	881.1000	283.27
4.000	3.992	634.4100	797.1000	277.25
5.000	4.989	560.3300	719.0000	271.49
6.000	5.986	493.[illegible]900	647.4000	265.61
7.000	6.983	433.5400	582.3000	259.36
8.000	7.979	379.5800	523.1000	252.81
9.000	8.975	331.1400	469.5000	245.72
10.000	9.971	287.7000	421.1000	238.03
11.000	10.966	248.7900	376.8000	230.03
12.000	11.961	214.0500	335.6000	222.06
13.000	12.956	183.1900	297.5000	214.51
14.000	13.951	156.0000	260.8000	208.38
15.000	14.945	132.3400	225.3000	204.61
16.000	15.939	112.0700	191.6000	203.82
17.000	16.932	94.[illegible]30	161.3000	205.07
18.000	17.925	80.5410	135.0000	207.79
19.000	18.918	68.4900	113.2000	210.79
20.000	19.911	58.3750	95.2100	213.60
21.000	20.903	49.8530	80.4100	215.98
22.000	21.895	42.6430	68.1700	217.91
23.000	22.886	36.5270	57.9000	219.76
24.000	23.878	31.7310	49.2400	221.66
25.000	24.869	26.9100	41.9600	223.42
26.000	25.859	23.1400	35.8200	225.07
27.000	26.850	19.9210	30.6[illegible]00	226.75
28.000	27.840	17.1700	26.1900	228.41
29.000	28.830	14.8150	22.4300	230.05
30.000	29.819	12.7971	19.2600	231.45

AUGUST

TABLE IV. 8 HYDROSTATIC MODEL ATMOSPHERE.
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1015.5000	1172.0000	301.97
.020	.020	1013.2000	1169.0000	301.83
1.000	.999	906.0400	1065.0000	296.24
2.000	1.997	806.4500	970.6000	289.46
3.000	2.995	715.9500	880.3000	283.34
4.000	3.992	634.0000	793.2000	277.40
5.000	4.989	560.0000	716.3000	271.59
6.000	5.986	493.3100	646.9000	265.64
7.000	6.983	433.3000	582.0000	259.35
8.000	7.979	379.3000	522.9000	252.75
9.000	8.975	330.9400	469.4000	245.63
10.000	9.971	287.5200	420.9000	237.99
11.000	10.966	248.6300	376.6000	229.97
12.000	11.961	213.9100	335.5000	222.14
13.000	12.956	183.0900	297.1000	214.71
14.000	13.951	155.9400	260.5000	208.55
15.000	14.945	132.3100	225.0000	204.82
16.000	15.939	112.0600	191.3000	204.09
17.000	16.932	94.9430	161.1000	205.35
18.000	17.925	80.5650	135.0000	207.93
19.000	18.918	68.5160	113.2000	210.84
20.000	19.911	58.3950	95.3000	213.47
21.000	20.903	49.9620	80.5400	215.66
22.000	21.895	42.[illegible]400	68.2900	217.52
23.000	22.886	36.5130	58.0100	219.29
24.000	23.878	31.3070	49.3400	221.03
25.000	24.869	26.8770	42.03[illegible]0	222.76
26.000	25.859	23.1010	35.8700	224.36
27.000	26.850	19.8780	30.6500	225.96
28.000	27.840	17.1240	26.2100	227.58
29.000	28.830	14.78[illegible]0	22.4500	229.14
30.000	29.819	12.7485	19.2000	230.60

SEPTEMBER

TABLE IV. 9 HYDROSTATIC MODEL ATMOSPHERE.
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1014.0000	1177.0000	300.32
.020	.020	1012.5000	1175.0000	300.15
1.000	.999	904.9100	1060.0000	294.94
2.000	1.997	805.0700	972.3000	288.46
3.000	2.995	714.5200	879.7000	282.96
4.000	3.992	632.6300	794.6000	277.39
5.000	4.989	558.8500	716.6000	271.69
6.000	5.986	492.2900	645.9000	265.51
7.000	6.983	432.3500	581.6000	258.97
8.000	7.979	378.4300	522.9000	252.12
9.000	8.975	330.0000	469.5000	244.84
10.000	9.971	286.5700	420.9000	237.20
11.000	10.966	247.6900	376.3000	229.28
12.000	11.961	213.0300	334.7000	221.73
13.000	12.956	182.3100	295.8000	214.74
14.000	13.951	155.2900	259.1000	208.79
15.000	14.945	131.7500	224.5000	204.43
16.000	15.939	111.5100	191.6000	202.73
17.000	16.932	94.3530	161.5000	203.54
18.000	17.925	79.9610	134.9000	206.49
19.000	18.918	67.9380	112.8000	209.87
20.000	19.911	57.8660	94.7400	212.78
21.000	20.903	49.3870	79.9900	215.09
22.000	21.895	42.2170	67.7800	216.99
23.000	22.886	36.1390	57.5200	218.85
24.000	23.878	30.9770	48.9100	220.65
25.000	24.869	26.5870	41.6000	222.34
26.000	25.859	22.8440	35.5500	223.84
27.000	26.850	19.6490	30.3800	225.29
28.000	27.840	16.9180	25.9900	226.76
29.000	28.830	14.5810	22.2600	228.24
30.000	29.819	12.5803	19.0800	229.75

OCTOBER

TABLE IV. 10 HYDROSTATIC MODEL ATMOSPHERE.
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1016.5000	1202.0000	294.87
.020	.020	1014.2000	1199.0000	294.61
1.000	.999	904.7400	1084.0000	290.80
2.000	1.997	803.7600	980.6000	285.54
3.000	2.995	712.5700	884.6000	280.63
4.000	3.992	630.3500	797.6000	275.30
5.000	4.989	556.2300	719.2000	269.42
6.000	5.986	489.4100	648.8000	262.60
7.000	6.983	429.1900	584.4000	255.82
8.000	7.979	375.0200	525.3000	248.69
9.000	8.975	326.3900	471.2000	241.31
10.000	9.971	282.8500	421.4000	233.84
11.000	10.966	244.0000	375.3000	226.52
12.000	11.961	209.5300	332.6000	219.87
13.000	12.956	179.1400	291.7000	213.95
14.000	13.951	152.5500	254.4000	208.88
15.000	14.945	129.4600	220.0000	204.96
16.000	15.939	109.6000	188.2000	202.89
17.000	16.932	92.7280	159.0000	203.12
18.000	17.925	78.5360	133.2000	205.41
19.000	18.918	66.6680	111.3000	208.67
20.000	19.911	56.7330	93.4100	211.57
21.000	20.903	48.3760	78.7800	213.91
22.000	21.895	41.3190	66.6700	215.92
23.000	22.886	35.3440	56.5300	217.82
24.000	23.878	30.2730	48.0300	219.60
25.000	24.869	25.9630	40.8800	221.22
26.000	25.859	22.2910	34.8700	222.72
27.000	26.850	19.1580	29.7800	224.11
28.000	27.840	16.4820	25.4700	225.44
29.000	28.830	14.1930	21.8000	226.80
30.000	29.819	12.2342	18.6800	228.18

NOVEMBER

TABLE IV. 11 HYDROSTATIC MODEL ATMOSPHERE.
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1018.4000	1229.0000	288.92
.020	.020	1016.0000	1226.0000	288.58
1.000	.999	904.4100	1101.0000	286.27
2.000	1.997	802.2500	988.4000	282.76
3.000	2.995	710.4600	889.3000	278.32
4.000	3.992	627.8100	801.6000	272.84
5.000	4.989	553.3400	722.4000	266.83
6.000	5.986	486.2500	651.0000	260.20
7.000	6.983	425.8700	585.6000	253.36
8.000	7.979	371.6100	525.9000	246.16
9.000	8.975	322.9500	471.3000	238.71
10.000	9.971	279.4200	421.1000	231.15
11.000	10.966	240.6300	374.3000	223.98
12.000	11.961	206.2900	330.4000	217.50
13.000	12.956	176.1100	289.2000	212.17
14.000	13.951	149.8300	250.6000	208.31
15.000	14.945	127.1500	215.6000	205.48
16.000	15.939	107.7000	184.4000	203.51
17.000	16.932	91.1350	156.4000	203.02
18.000	17.925	77.1430	131.7000	204.11
19.000	18.918	65.4040	110.1000	206.86
20.000	19.911	55.5770	92.3400	209.66
21.000	20.903	47.3210	77.7700	211.97
22.000	21.895	40.3610	65.6900	214.04
23.000	22.886	34.4770	55.6200	215.95
24.000	23.878	29.4930	47.1600	217.88
25.000	24.869	25.2630	40.1000	219.47
26.000	25.859	21.6630	34.1600	220.90
27.000	26.850	18.5950	29.1500	222.21
28.000	27.840	15.9770	24.9000	223.49
29.000	28.830	13.7400	21.2900	224.78
30.000	29.819	11.8284	18.2100	226.27

DECEMBER

TABLE IV. 12 HYDROSTATIC MODEL ATMOSPHERE.
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1019.7000	1245.0000	285.57
.020	.020	1017.2000	1242.0000	285.21
1.000	.999	904.5000	1109.0000	284.03
2.000	1.997	801.6300	994.1000	280.91
3.000	2.995	709.3600	893.2000	276.66
4.000	3.992	626.3900	804.4000	271.29
5.000	4.989	551.6700	724.8000	265.16
6.000	5.986	484.4000	652.5000	258.61
7.000	6.983	423.6900	586.7000	251.71
8.000	7.979	369.5400	526.6000	244.45
9.000	8.975	320.8200	471.8000	236.90
10.000	9.971	277.2700	421.0000	229.43
11.000	10.966	238.5300	373.5000	222.46
12.000	11.961	204.2900	328.9000	216.37
13.000	12.956	174.3200	286.5000	212.00
14.000	13.951	148.3400	247.2000	209.06
15.000	14.945	125.9700	212.6000	206.39
16.000	15.939	106.7600	182.2000	204.13
17.000	16.932	90.3690	155.0000	203.06
18.000	17.925	76.4720	131.0000	203.34
19.000	18.918	64.7790	109.8000	205.49
20.000	19.911	54.9820	92.0500	208.09
21.000	20.903	46.7620	77.3500	210.60
22.000	21.895	39.8450	65.2200	212.84
23.000	22.886	34.0060	55.1800	214.68
24.000	23.878	29.0620	46.7700	216.45
25.000	24.869	24.8700	39.7000	218.26
26.000	25.859	21.3100	33.7500	219.94
27.000	26.850	18.2830	28.7300	221.70
28.000	27.840	15.7050	24.4900	223.40
29.000	28.830	13.5060	20.9100	224.99
30.000	29.819	11.6297	17.8600	226.79

ANNUAL

TABLE IV. 13 HYDROSTATIC MODEL ATMOSPHERE,
STATION = 722210 EGLIN AIR FORCE BASE

Z KM	GEO. HT. KM	P MB	D G/M3	TV DEG K
.000	.000	1016.8000	1206.0000	293.98
.020	.020	1014.4000	1205.0000	293.36
1.000	.999	904.4800	1088.0000	289.48
2.000	1.997	803.1300	983.7000	284.42
3.000	2.995	711.6300	887.8000	279.24
4.000	3.992	629.0700	801.2000	273.52
5.000	4.989	554.6200	722.5000	267.43
6.000	5.986	487.5400	650.6000	260.98
7.000	6.983	427.1800	585.3000	254.28
8.000	7.979	372.9600	525.5000	247.22
9.000	8.975	324.3300	471.0000	239.86
10.000	9.971	260.8100	421.0000	232.34
11.000	10.966	242.0200	374.5000	225.15
12.000	11.961	207.6500	330.7000	218.74
13.000	12.956	177.4500	299.3000	213.72
14.000	13.951	151.1500	250.9000	209.90
15.000	14.945	128.4200	216.4000	206.76
16.000	15.939	108.8800	185.2000	204.82
17.000	16.932	92.2410	157.2000	204.42
18.000	17.925	78.1690	132.5000	205.54
19.000	18.918	66.3450	111.1000	208.09
20.000	19.911	56.4310	93.2000	210.92
21.000	20.903	48.0990	78.5000	213.45
22.000	21.895	41.0710	66.3500	215.65
23.000	22.886	35.1250	56.2500	217.54
24.000	23.878	30.0900	47.7700	219.36
25.000	24.869	25.7440	40.6400	221.09
26.000	25.859	22.1450	34.6400	222.71
27.000	26.850	19.0350	29.5500	224.38
28.000	27.840	16.3800	25.2500	226.00
29.000	28.830	14.1120	21.5900	227.70
30.000	29.819	12.1726	18.4900	229.57

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APPENDIX A

EXAMPLES OF WIND STATISTICS FOR EGLIN AFB, FLORIDA

Appendix A gives some examples of further computations and graphical displays of wind statistics that can be derived from the statistical parameters presented in table I. These illustrations should aid the user of the RRA to understand the functional relationships of the probability wind models and, thus, to develop an appreciation of the powerful properties of the bivariate normal probability distribution function (PDF).

All illustrations for this appendix are derived from the five wind component statistical parameters from table I.1 for January and table I.7 for July for nine selected altitudes. These selected altitudes are 2, 4, 8, 12, 16, 20, 24, 28, and 30 km.

1. Windspeed (Tables A-1 and A-2)

The five wind components from table I are used as inputs to the generalized Rayleigh PDF, equation (29), and numerically integrated as indicated by equation (30) to obtain the PDF for windspeed. The PDF is then interpolated to obtain the percentile values for windspeed, as shown in tables A-1 and A-2.

2. Frequency of Wind Direction (Figures A-1 through A-18)

The derived frequencies for wind direction shown in figures A-1 through A-18 were obtained using the five wind component parameters from tables I.1 and I.7 as input values in equation (35). The limits of integration (performed numerically) are over the 22.5-degree interval for each of the 16 compass points. These graphs give the percentage frequency that the wind will blow from the direction intervals.

3. Mean Wind Components and 80th Interpercentile Range of Wind Components (Figures A-19 through A-36)

The wind component means with respect to any orthogonal axes are obtained by using the zonal and meridional mean wind components in equations (44) and (45). These component means form the circle shown in figures A-19 through A-36. Further, the zonal and meridional wind component variances and correlation coefficients are used in equations (46) and (47) to obtain the variances with respect to any orthogonal axes. These rotated component variances and the rotated component means are used in equation (8) to obtain the 80th interpercentile range of wind components and are then illustrated in figures A-19 through A-36.

4. Probability Ellipses (Figures A-37 through A-54)

Using the five wind component parameters from tables I.1 and I.7 and $p = 0.50$, $p = 0.95$, and $p = 0.99$ as input values to equation (13), the wind

probability ellipses shown in figures A-37 through A-54 were obtained by computer graphics. The statistical inferences are, for example, that 50 percent of the wind vectors lie within the smaller ellipse and 99 percent of the wind vectors lie within the outer ellipse. These probability ellipses are illustrated using the standard meteorological coordinate system explained in section I.B.1.

5. Conditional Windspeed Given the Wind Direction (Figures A-55 through A-72)

The five wind component parameters from table I.1 and table I.7 are used to evaluate the conditional PDF, equation (41). Interpolations of the conditional function are made to obtain the 5th, 15th, 50th (median), 85th, 95th, and 99th conditional percentile values of windspeed given the wind directions, are as shown in figures A-55 through A-72. The conditional mean windspeed, given the wind direction, is obtained from equation (40). The conditional mode (most probable) windspeed, given the wind direction, is obtained from equation (38). The conditional mean windspeed and the conditional windspeed modal value, given the wind direction, are also shown in these figures. For some figures, the conditional windspeed values are invalid for the given wind direction near 270° (from the west). This is caused by the lack of computational precision in evaluating equations (40) and (41) when the arguments for the Gaussian probability distribution have large negative values, i.e., when the coefficients (b/a) become less than -4 in these equations.

This appendix contains only a few of the many options in presenting wind statistics illustrations.

TABLE A-1. DERIVED (RAYLEIGH) PERCENTILES FOR WINDSPEED, JANUARY, EGLIN AFB, FLORIDA

	Altitude (km)								
	2	4	8	12	16	20	24	28	30
P	R	R	R	R	R	R	R	R	R
%	M/S	M/S	M/S	M/S	M/S	M/S	M/S	M/S	M/S
1.0	1.34	2.77	5.19	8.98	10.09	1.17	.90	1.26	1.65
2.5	2.21	4.36	8.07	13.30	13.20	1.94	1.43	2.10	2.70
5.0	3.16	6.09	11.14	17.54	15.98	2.78	2.14	3.03	3.91
10.0	4.51	8.41	15.20	22.76	19.21	4.08	3.13	4.39	5.69
15.0	5.59	10.14	18.16	26.41	21.41	5.15	3.96	5.53	7.18
20.0	6.51	11.56	20.60	29.36	23.18	6.13	4.71	6.57	8.55
30.0	8.16	13.99	24.70	34.23	26.07	8.00	6.17	8.57	11.18
40.0	9.66	16.11	28.28	38.43	28.54	9.83	7.68	10.62	13.86
50.0	11.13	18.13	31.68	42.39	30.86	11.70	9.34	12.84	16.73
60.0	12.65	20.18	35.11	46.37	33.19	13.67	11.21	15.36	19.86
70.0	14.31	22.40	38.81	50.65	35.69	15.84	13.43	18.33	23.42
80.0	16.30	25.00	43.17	55.68	38.63	18.42	16.20	22.04	27.75
85.0	17.55	26.63	45.86	58.78	40.43	20.00	17.96	24.42	30.45
90.0	19.11	28.67	49.26	62.69	42.70	22.02	20.23	27.47	33.88
95.0	21.48	31.70	54.31	68.49	46.05	25.02	23.66	32.05	39.01
97.5	23.54	34.35	58.70	73.54	48.98	27.65	26.66	36.09	43.49
99.0	25.93	37.43	63.82	79.41	52.41	30.70	30.17	40.82	48.71

TABLE A-2. DERIVED (RAYLEIGH) PERCENTILES FOR WINDSPEED, JULY, EGLIN AFB, FLORIDA

	Altitude (km)								
	2	4	8	12	16	20	24	28	30
P	R	R	R	R	R	R	R	R	R
%	M/S	M/S	M/S	M/S	M/S	M/S	M/S	M/S	M/S
1.0	.36	.41	.65	1.18	.77	4.12	9.77	11.14	12.06
2.5	.89	1.01	1.22	1.96	1.32	5.15	10.81	12.41	13.37
5.0	1.28	1.36	1.78	2.77	1.97	6.07	11.68	13.53	14.54
10.0	1.91	2.05	2.58	4.02	2.80	7.11	12.71	14.85	15.92
15.0	2.36	2.53	3.24	4.99	3.46	7.81	13.39	15.71	16.82
20.0	2.78	3.01	3.81	5.85	4.06	8.37	13.98	16.40	17.53
30.0	3.53	3.80	4.83	7.41	5.10	9.30	14.86	17.54	18.71
40.0	4.25	4.57	5.79	8.88	6.06	10.11	15.62	18.51	19.72
50.0	4.95	5.35	6.77	10.37	7.01	10.84	16.34	19.41	20.66
60.0	5.71	6.17	7.81	11.96	8.02	11.59	17.06	20.32	21.61
70.0	6.57	7.10	8.97	13.76	9.16	12.40	17.83	21.29	22.62
80.0	7.61	8.28	10.44	15.98	10.57	13.33	18.73	22.43	23.80
85.0	8.27	8.99	11.38	17.43	11.47	13.89	19.29	23.11	24.53
90.0	9.11	9.97	12.59	19.29	12.64	14.64	19.95	23.97	25.45
95.0	10.46	11.52	14.48	22.18	14.43	15.71	20.97	25.30	26.79
97.5	11.64	12.87	16.15	24.81	15.99	16.65	21.89	26.44	27.94
99.0	12.99	14.55	18.21	27.97	17.91	17.73	22.92	27.75	29.34

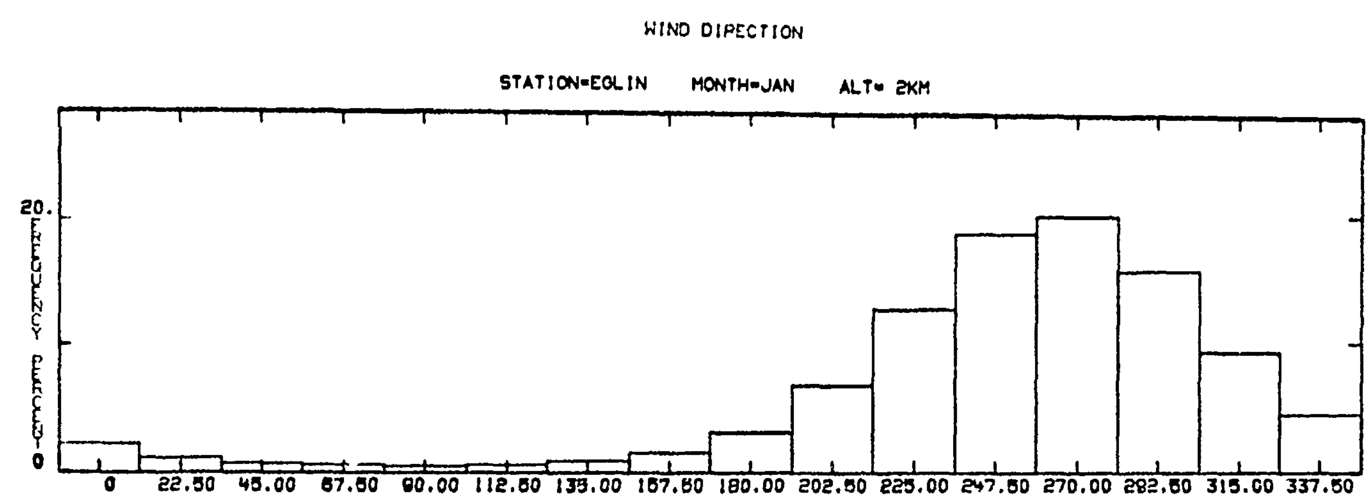
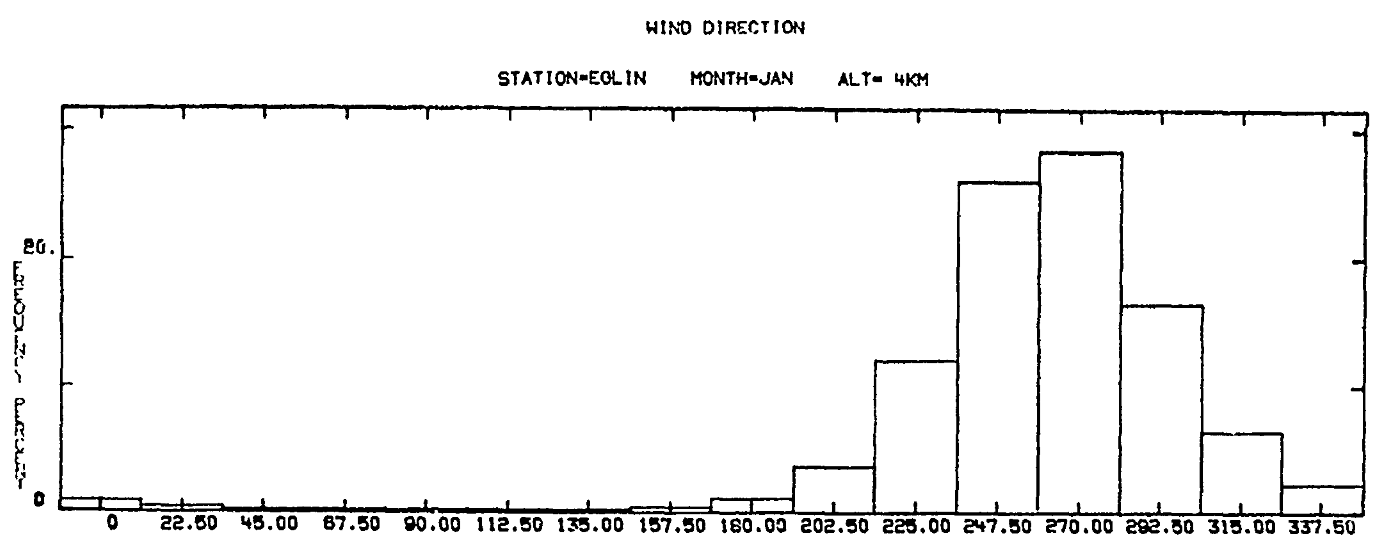

WIND DIRECTION
STATION=EGLIN MONTH=JAN ALT= 2KM
20.
FREQUENCY PERCENT
0
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50

Fig. A-1


WIND DIRECTION
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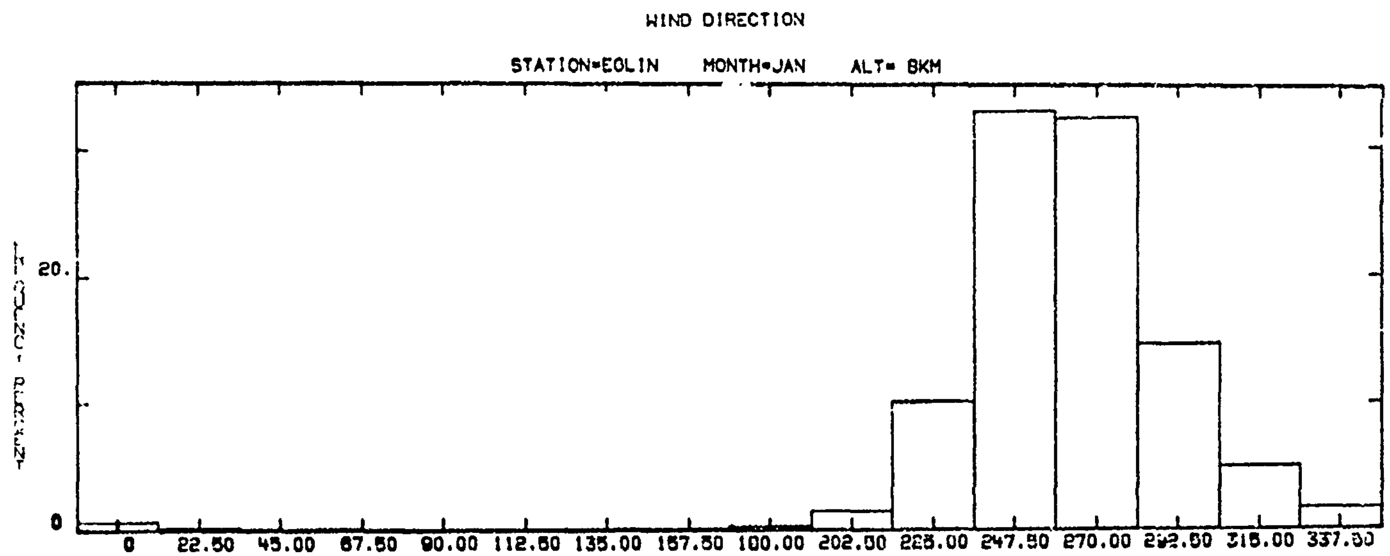
20.
FREQUENCY PERCENT
0
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50

Fig. A-2


WIND DIRECTION
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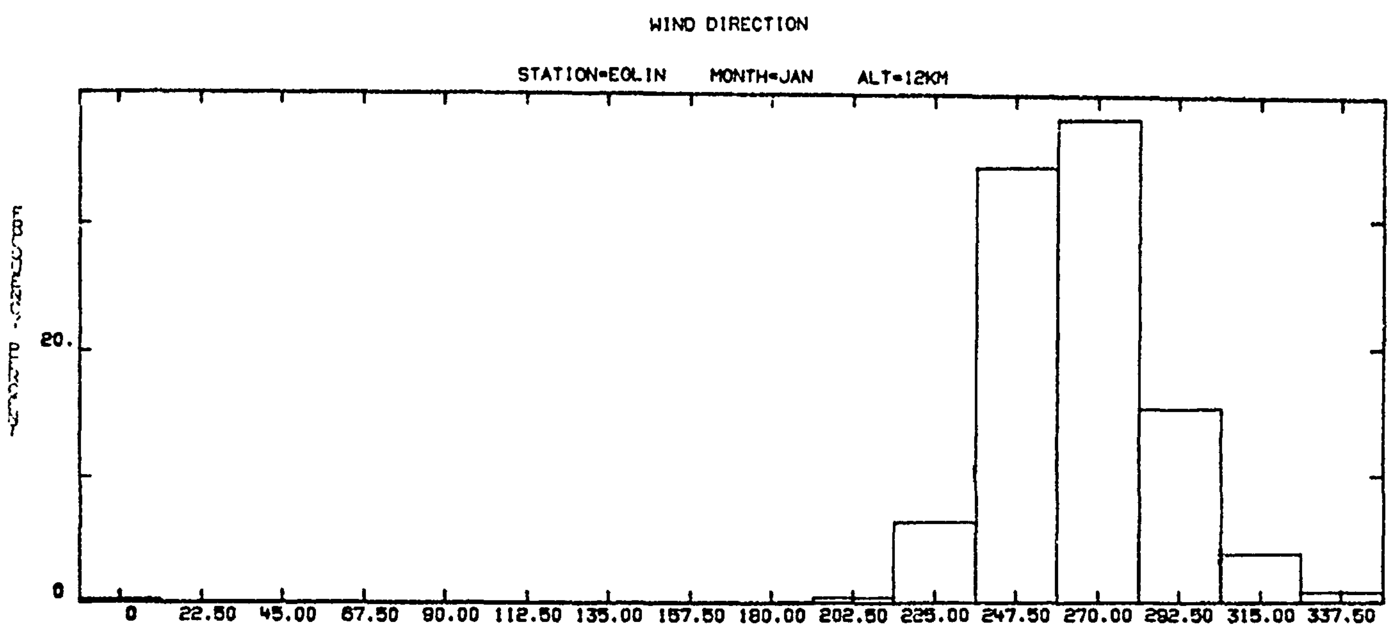
20.
0
0 22.50 45.00 67.50 90.00 112.50 135.00 157.50 100.00 202.50 225.00 247.50 270.00 292.50 315.00 337.50

Fig. A-3


WIND DIRECTION
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20.
0
0 22.50 45.00 67.50 90.00 112.50 135.00 157.50 180.00 202.50 225.00 247.50 270.00 292.50 315.00 337.50

Fig. A-4

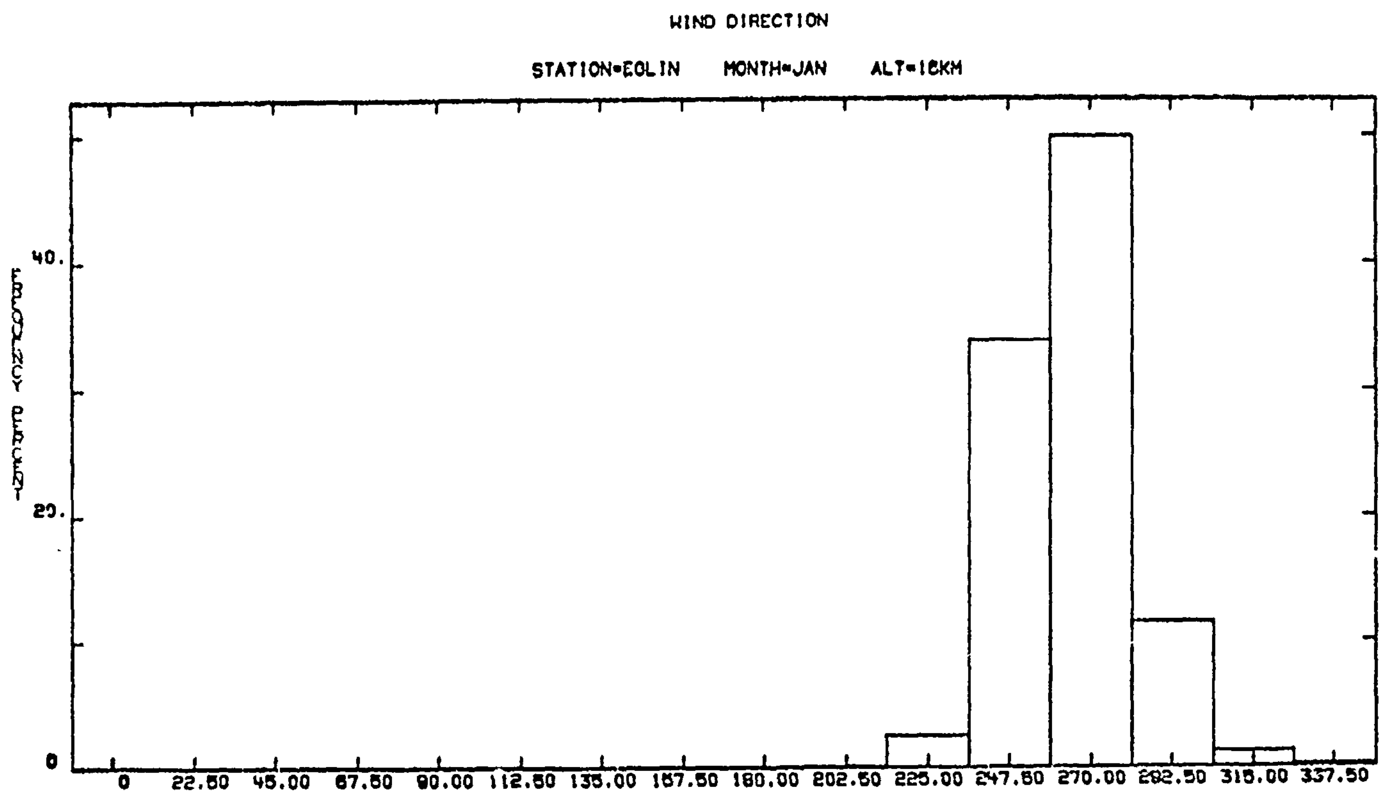

WIND DIRECTION
STATION=EOLIN MONTH=JAN ALT=18KM
40.
20.
0
0 22.50 45.00 67.50 90.00 112.50 135.00 157.50 180.00 202.50 225.00 247.50 270.00 292.50 315.00 337.50

Fig. A-5

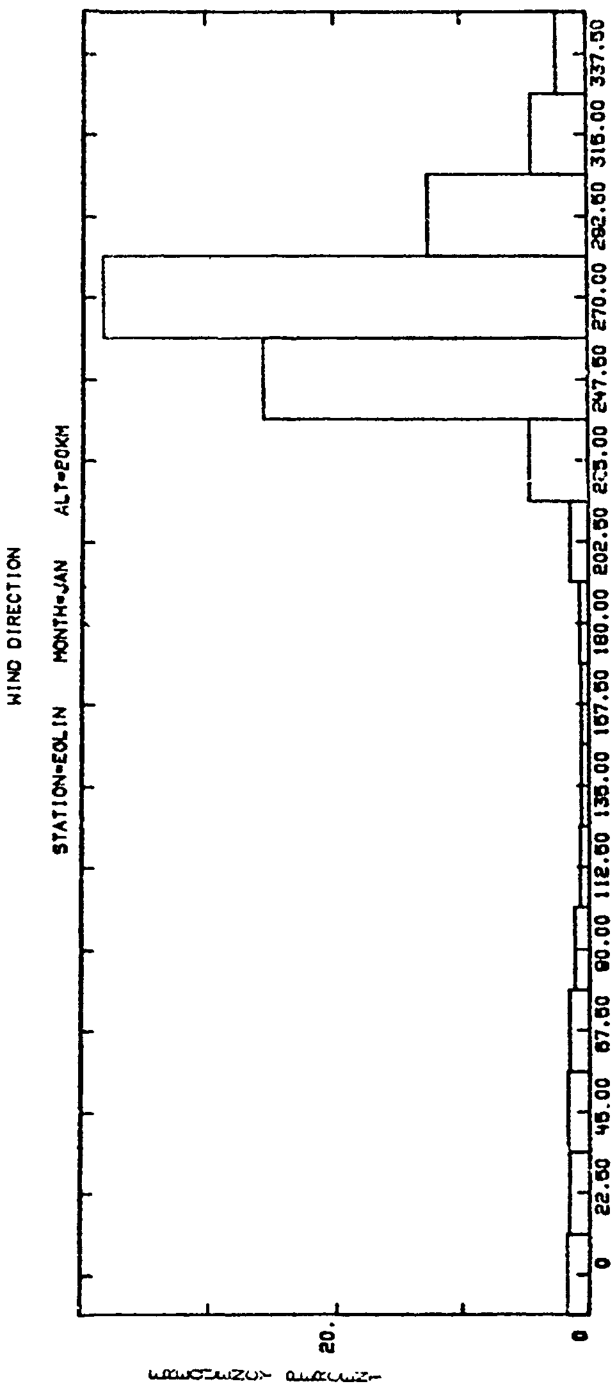
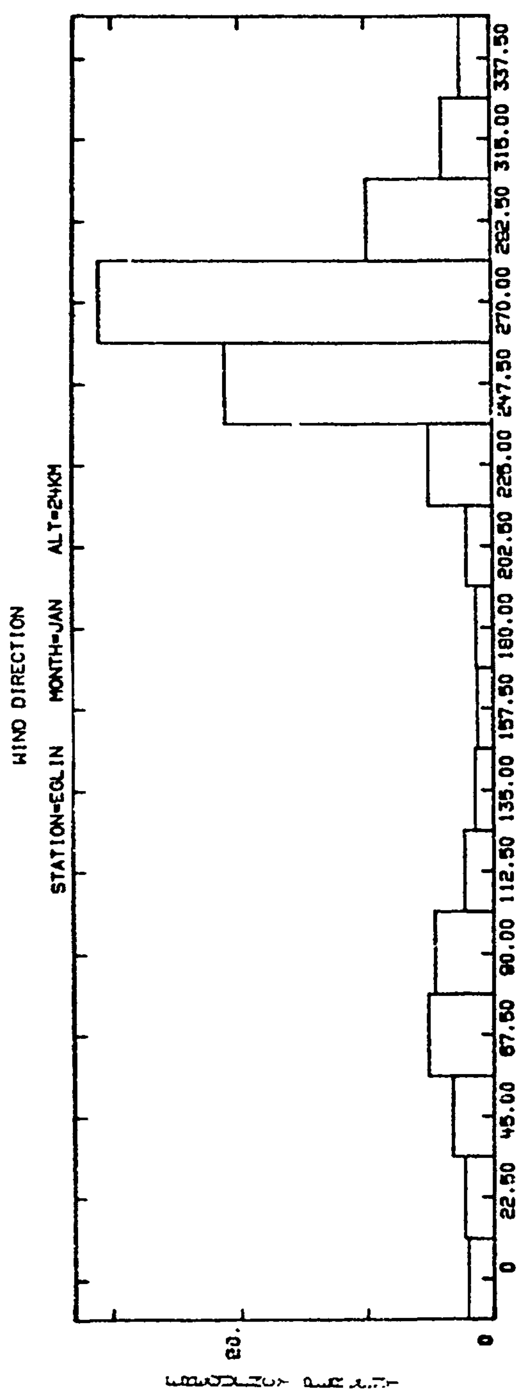

WIND DIRECTION
STATION=EGLIN MONTH=JAN ALT=20KM
20.
0
0 22.50 45.00 67.50 90.00 112.50 135.00 157.50 180.00 202.50 225.00 247.50 270.00 292.50 315.00 337.50

Fig. A-6


WIND DIRECTION
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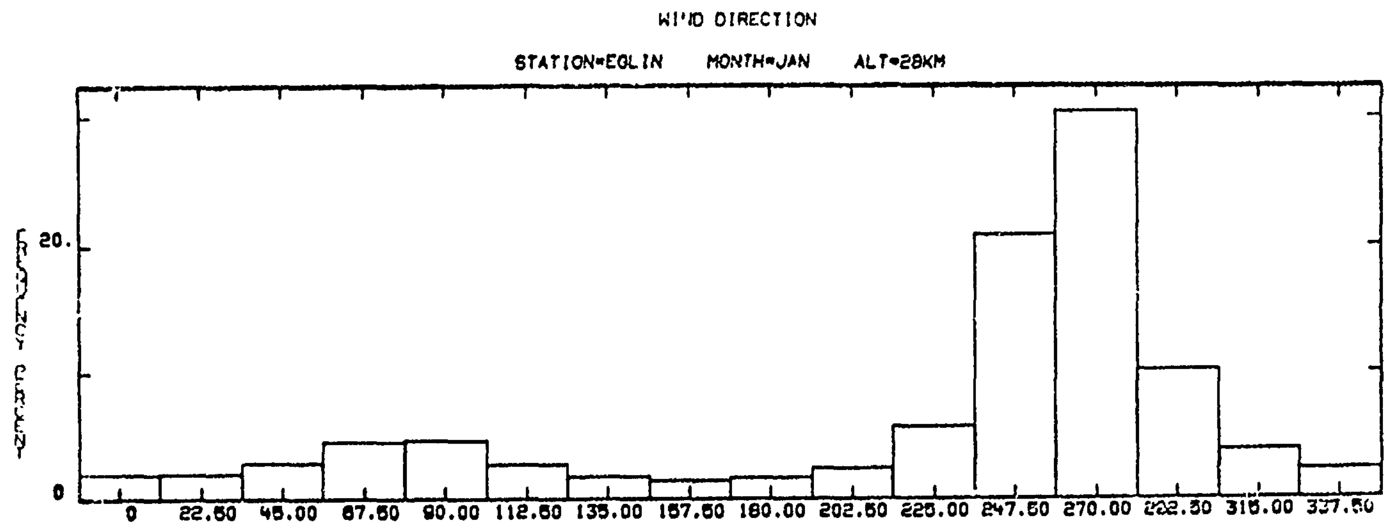
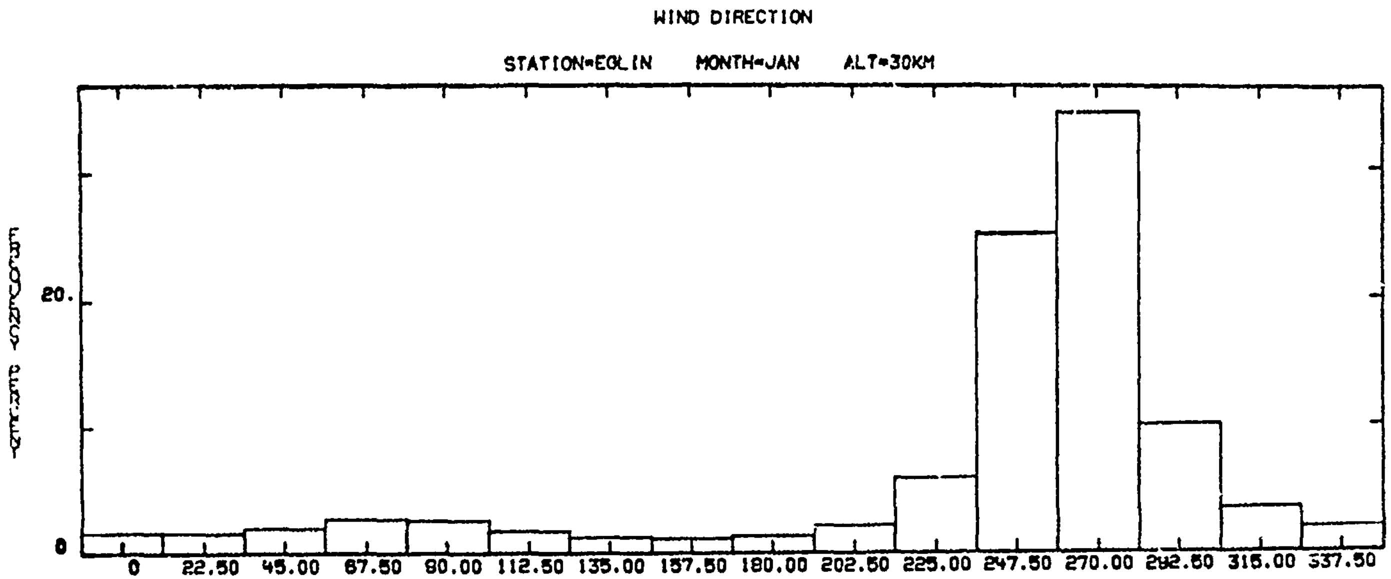
20.
0
0 22.50 45.00 67.50 90.00 112.50 135.00 157.50 180.00 202.50 225.00 247.50 270.00 292.50 315.00 337.50

Fig. A-7



WIND DIRECTION
STATION=EGLIN MONTH=JAN ALT=28KM
FREQUENCY PERCENT
20.
0
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50

Fig. A-3



WIND DIRECTION
STATION=EGLIN MONTH=JAN ALT=30KM
FREQUENCY PERCENT
20.
0
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50

Fig. A-9

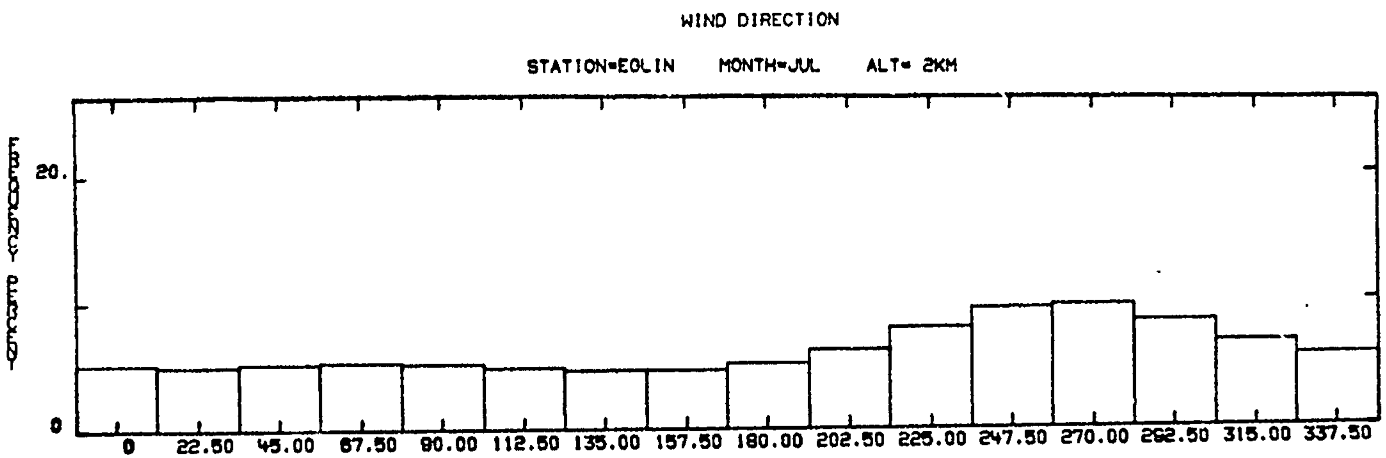


Fig. A-10

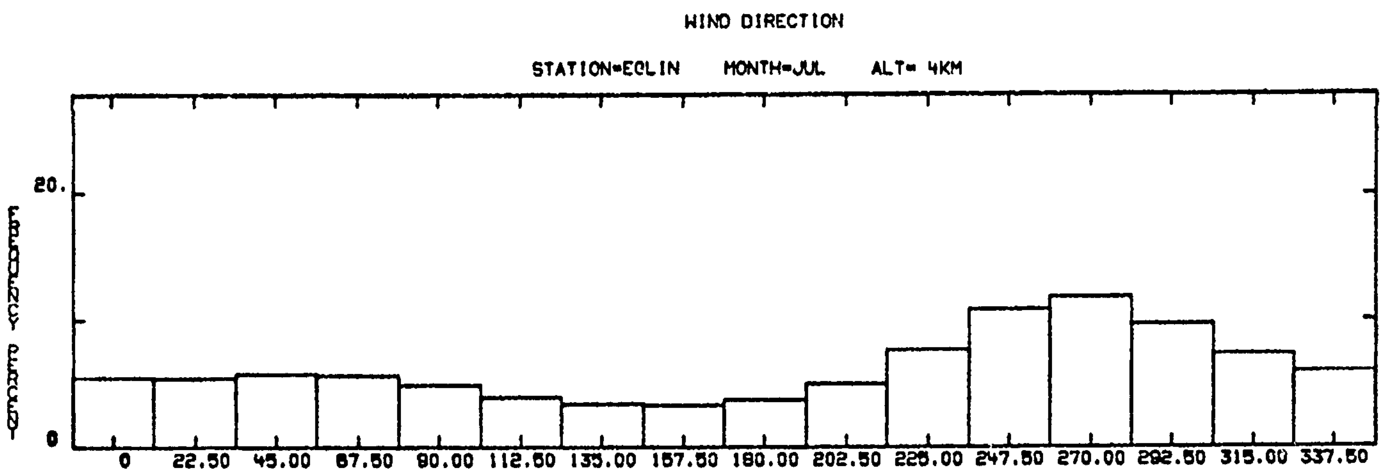


Fig. A-11

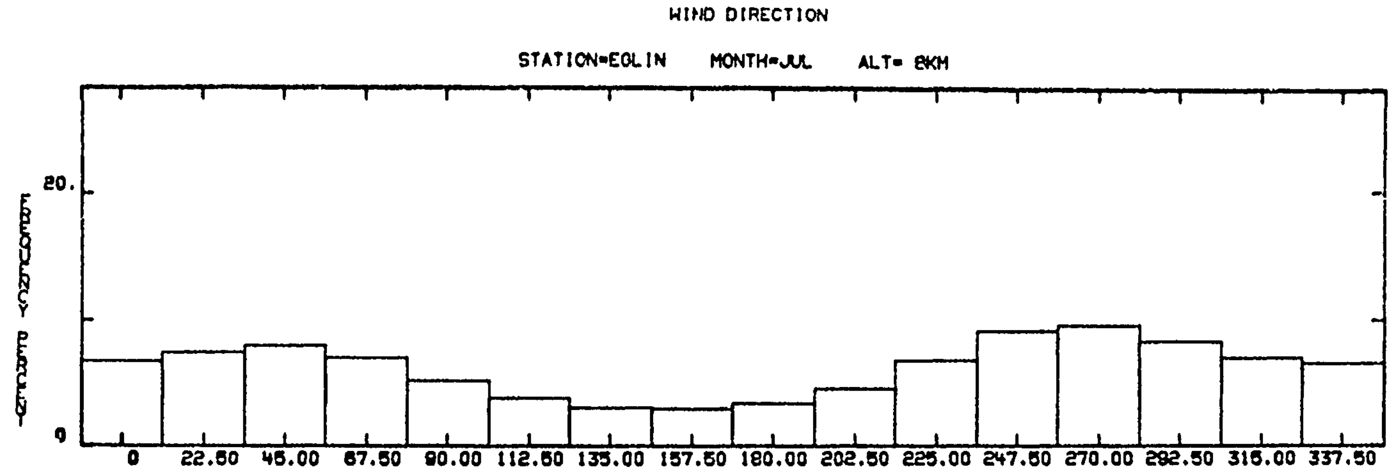


Fig. A-12

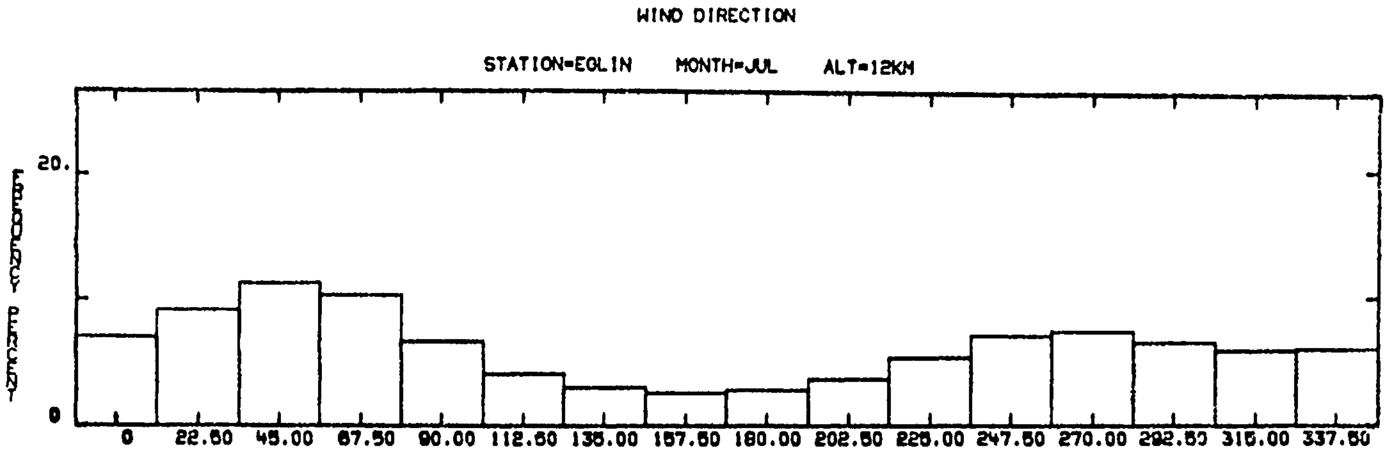


Fig. A-13

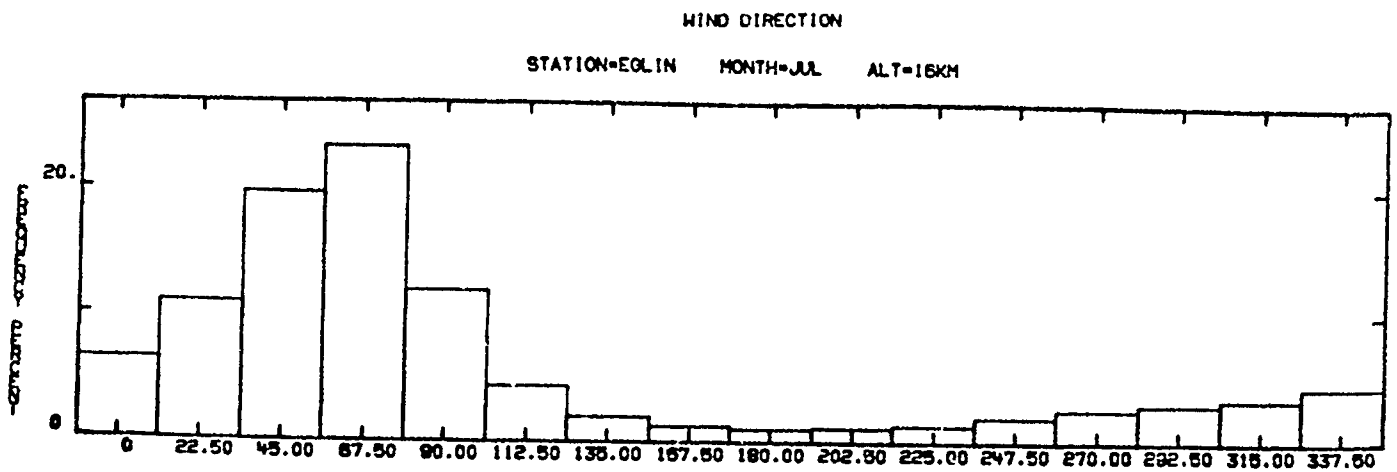

WIND DIRECTION
STATION=EGLIN MONTH=JUL ALT=16KM
20.
0
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50

Fig. A-14

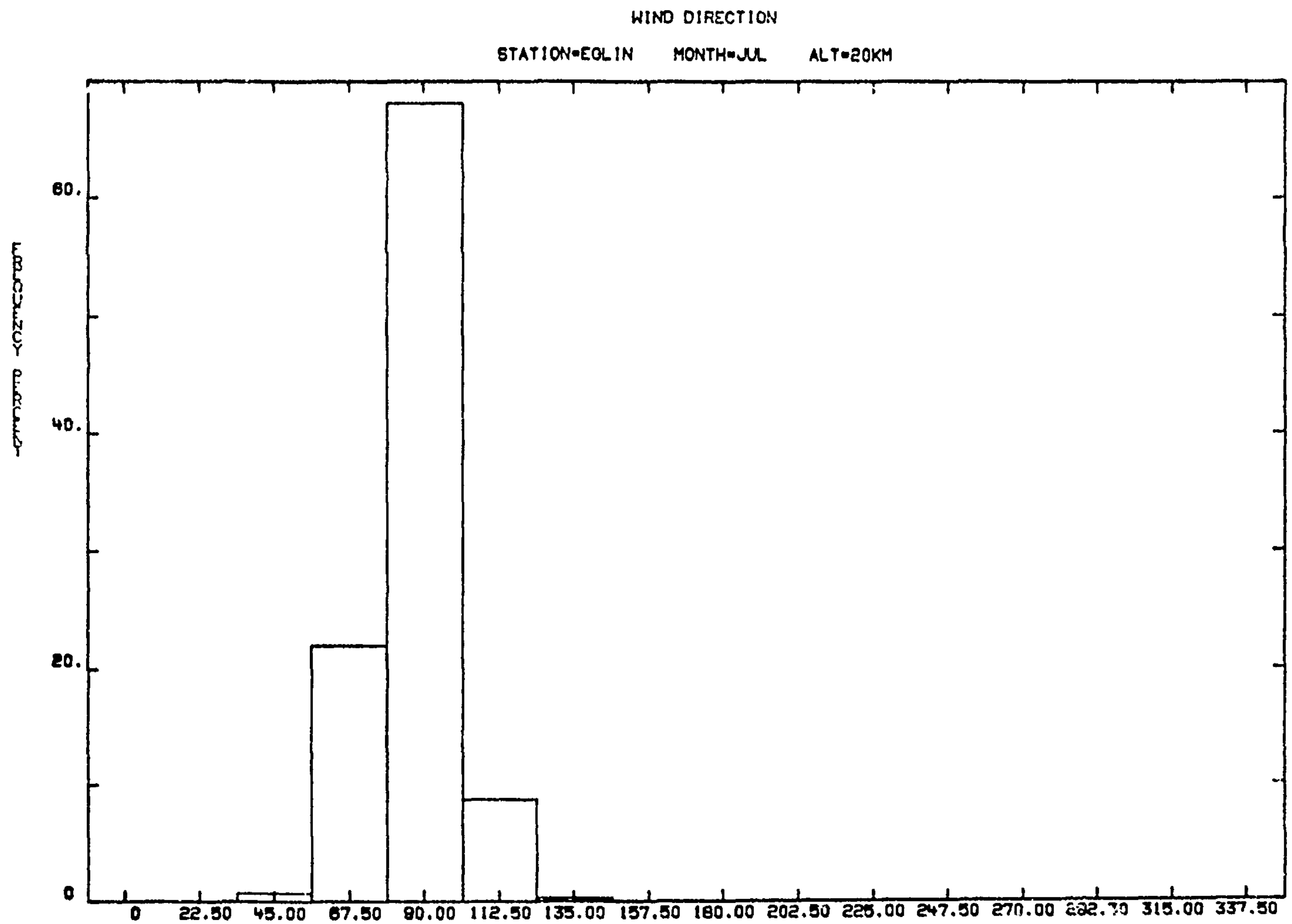

WIND DIRECTION
STATION=EGLIN MONTH=JUL ALT=20KM
60.
40.
20.
0
0 22.50 45.00 67.50 90.00 112.50 135.00 157.50 180.00 202.50 225.00 247.50 270.00 315.00 337.50

Fig. A-15

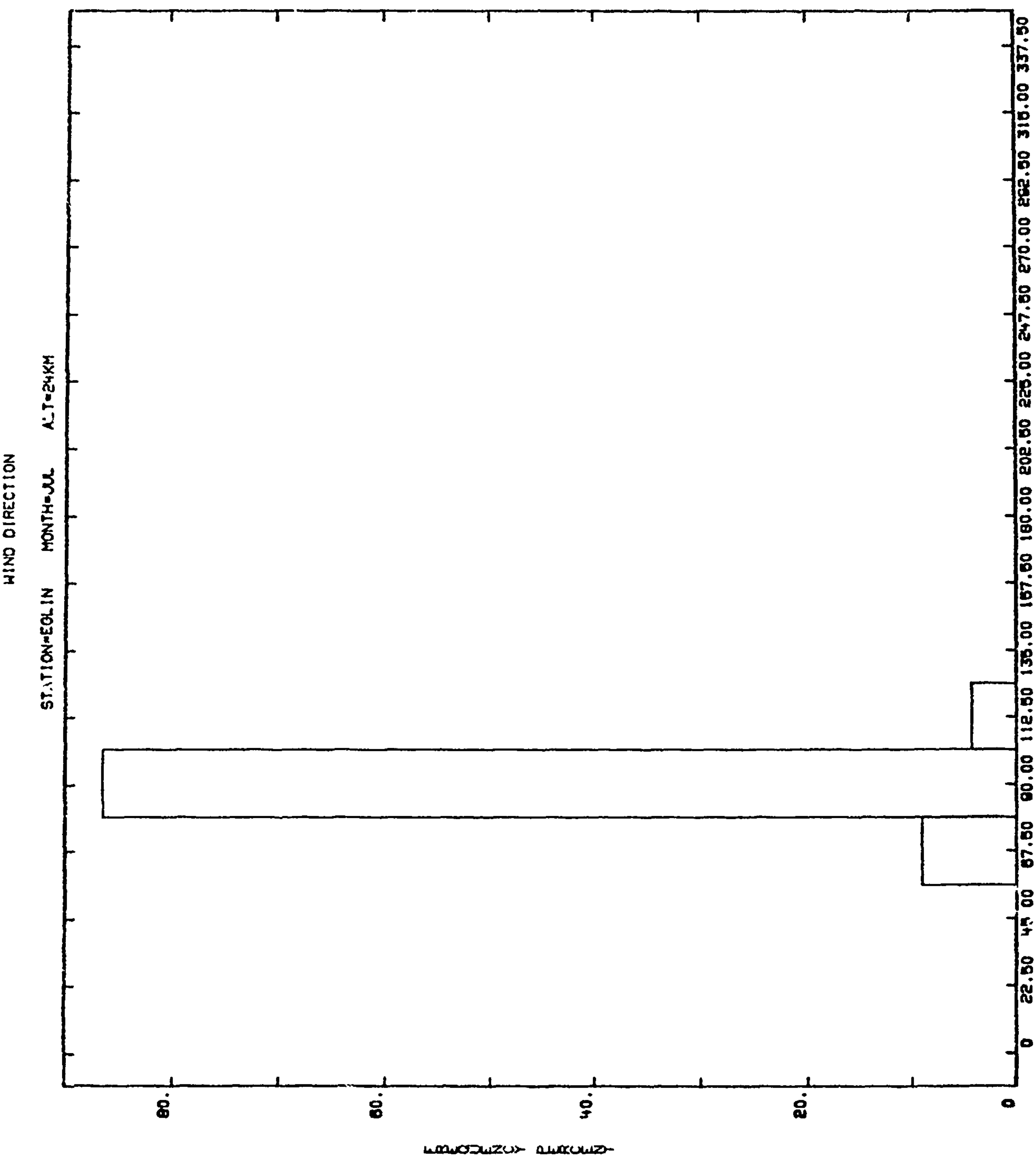

WIND DIRECTION
STATION=EGLIN MONTH=JUL ALT=24KM
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
0
20.
40.
60.
80.

Fig. A-16

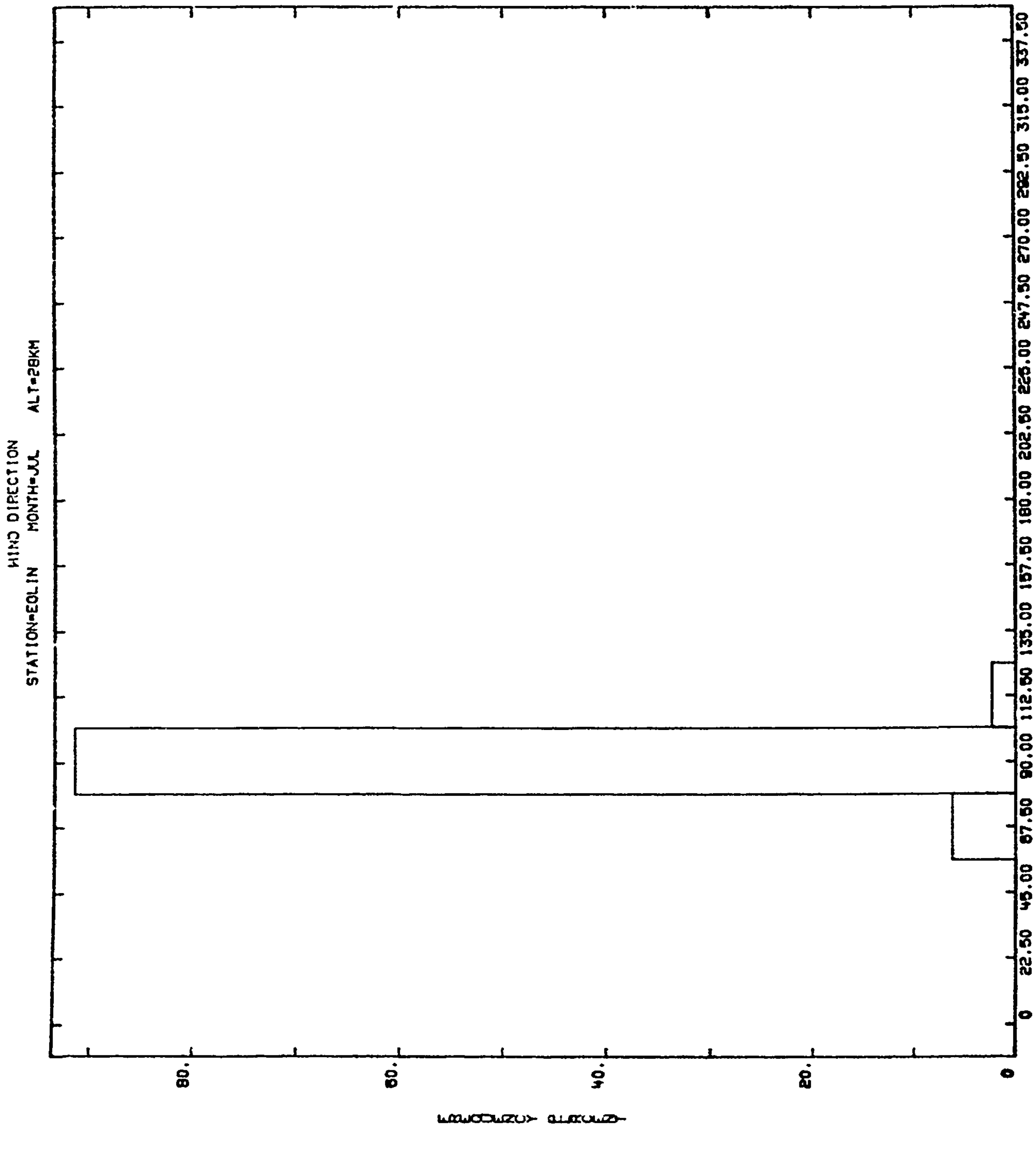

WIND DIRECTION
STATION=EOLIN MONTH=JUL ALT=28KM
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
0
20.
40.
60.
80.

Fig. A-17

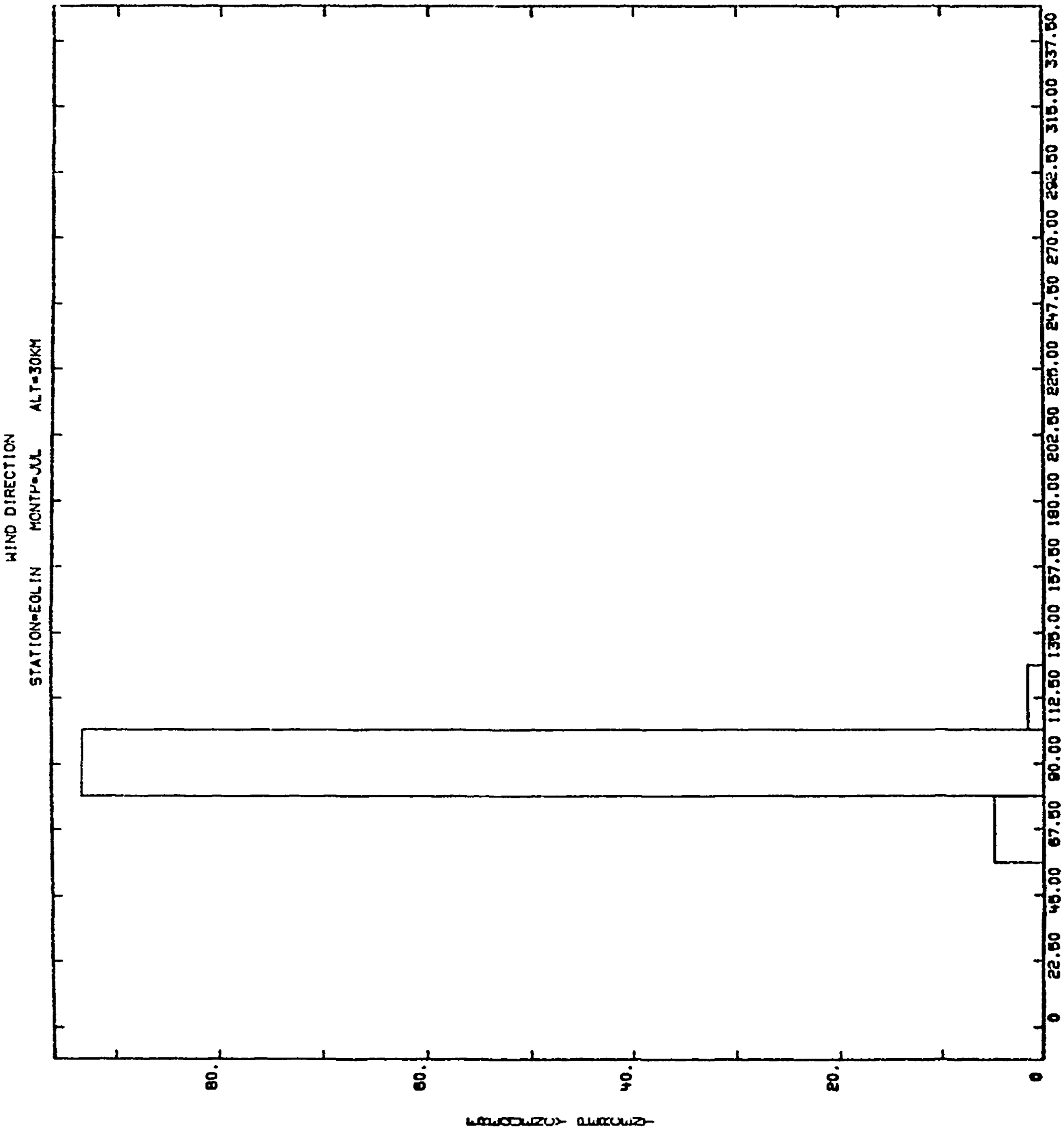

WIND DIRECTION
STATION=EGLIN MONTH=JUL ALT=30KM
0
22.50
45.00
67.50
90.00
112.50
135.00
157.50
180.00
202.50
225.00
247.50
270.00
292.50
315.00
337.50
0
20.
40.
60.
80.

Fig. A-18

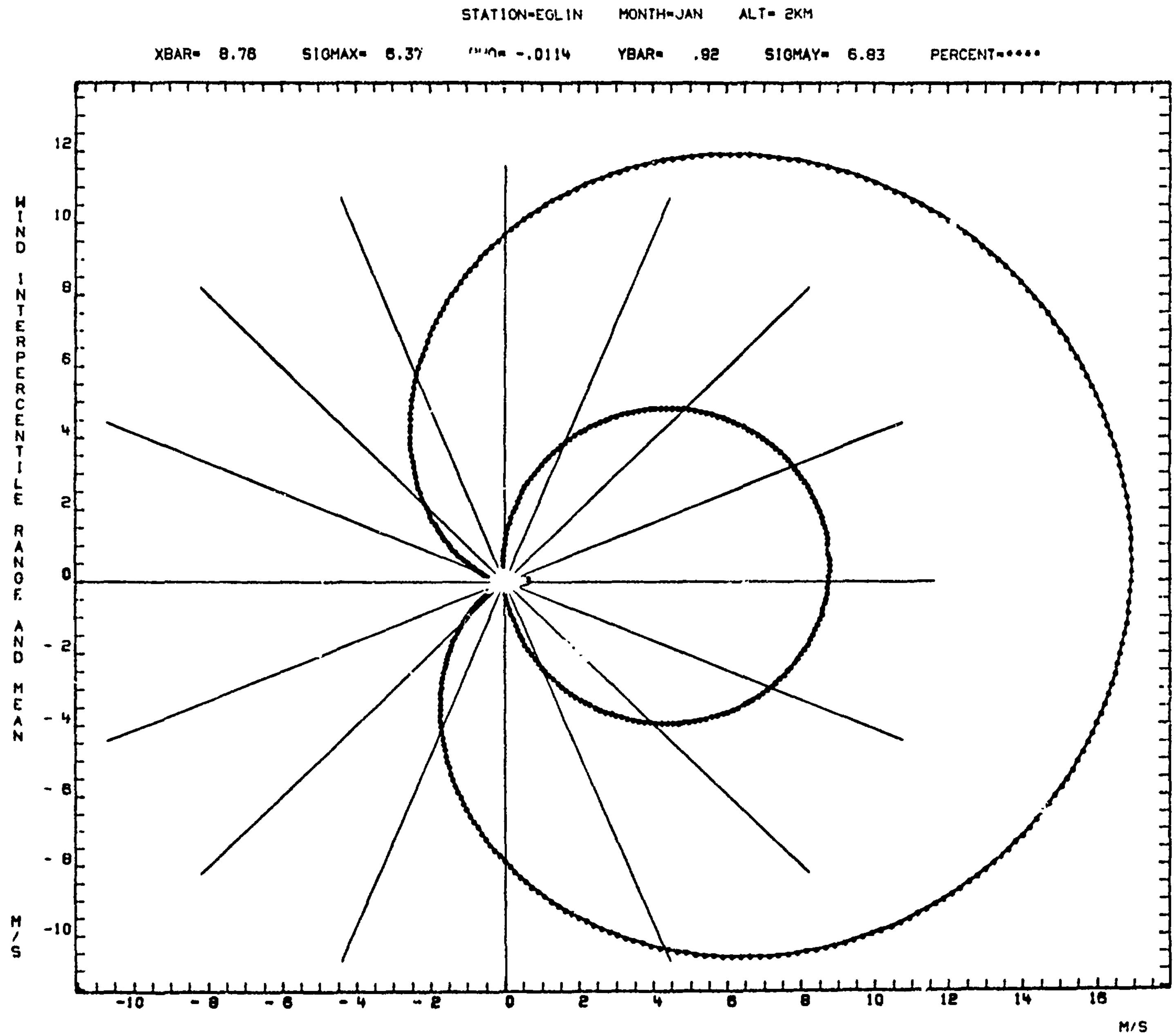
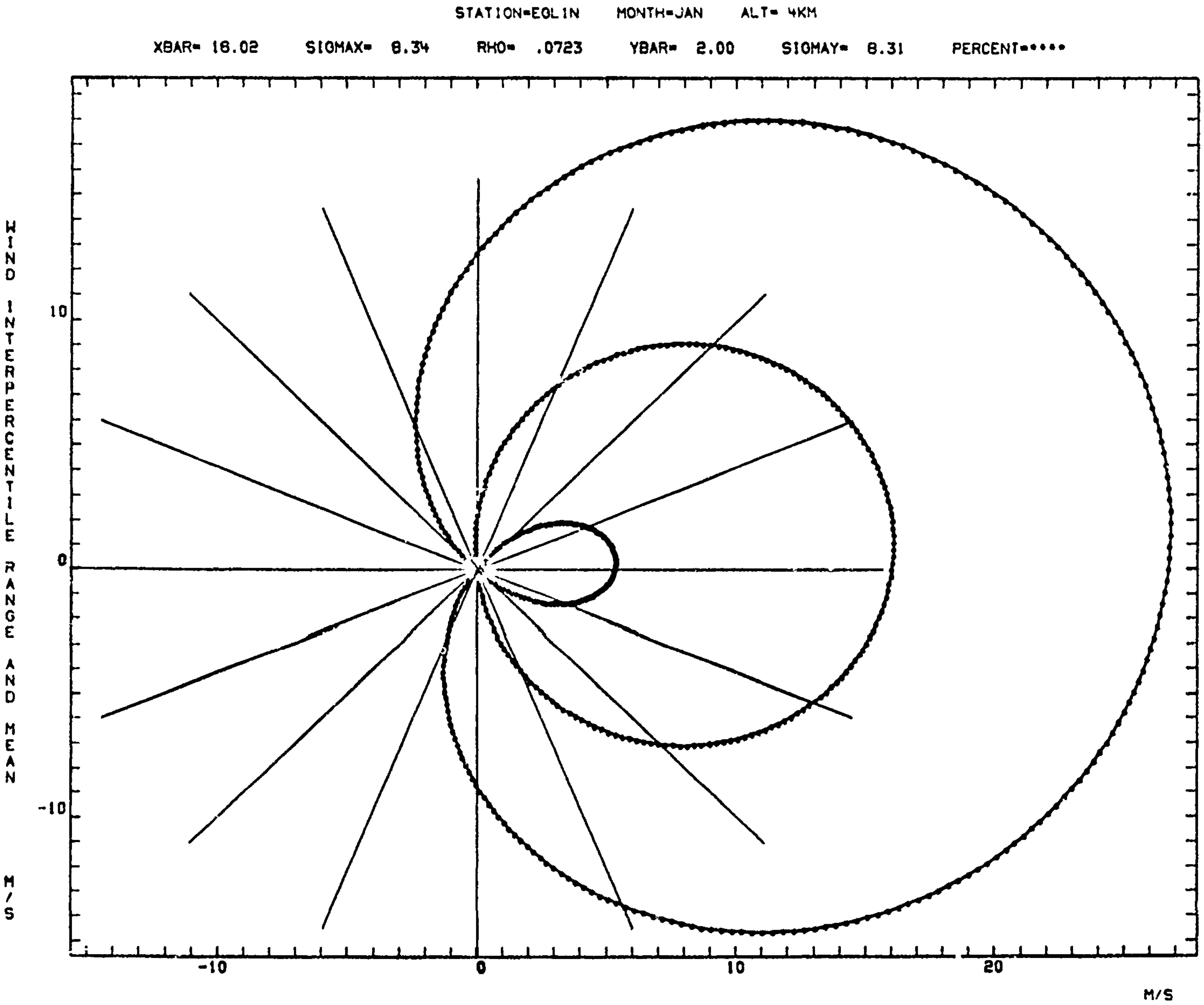

STATION=EGLIN MONTH=JAN ALT= 2KM
XBAR= 8.78 SIGMAX= 6.37 = -.0114 YBAR= .92 SIGMAY= 6.83 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
M/S

Fig. A-19



STATION=EGLIN MONTH=JAN ALT= 4KM
XBAR= 16.02 SIGMAX= 8.34 RHO= .0723 YBAR= 2.00 SIGMAY= 8.31 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
10
0
-10
-10
0
10
20
M/S

Fig. A-20

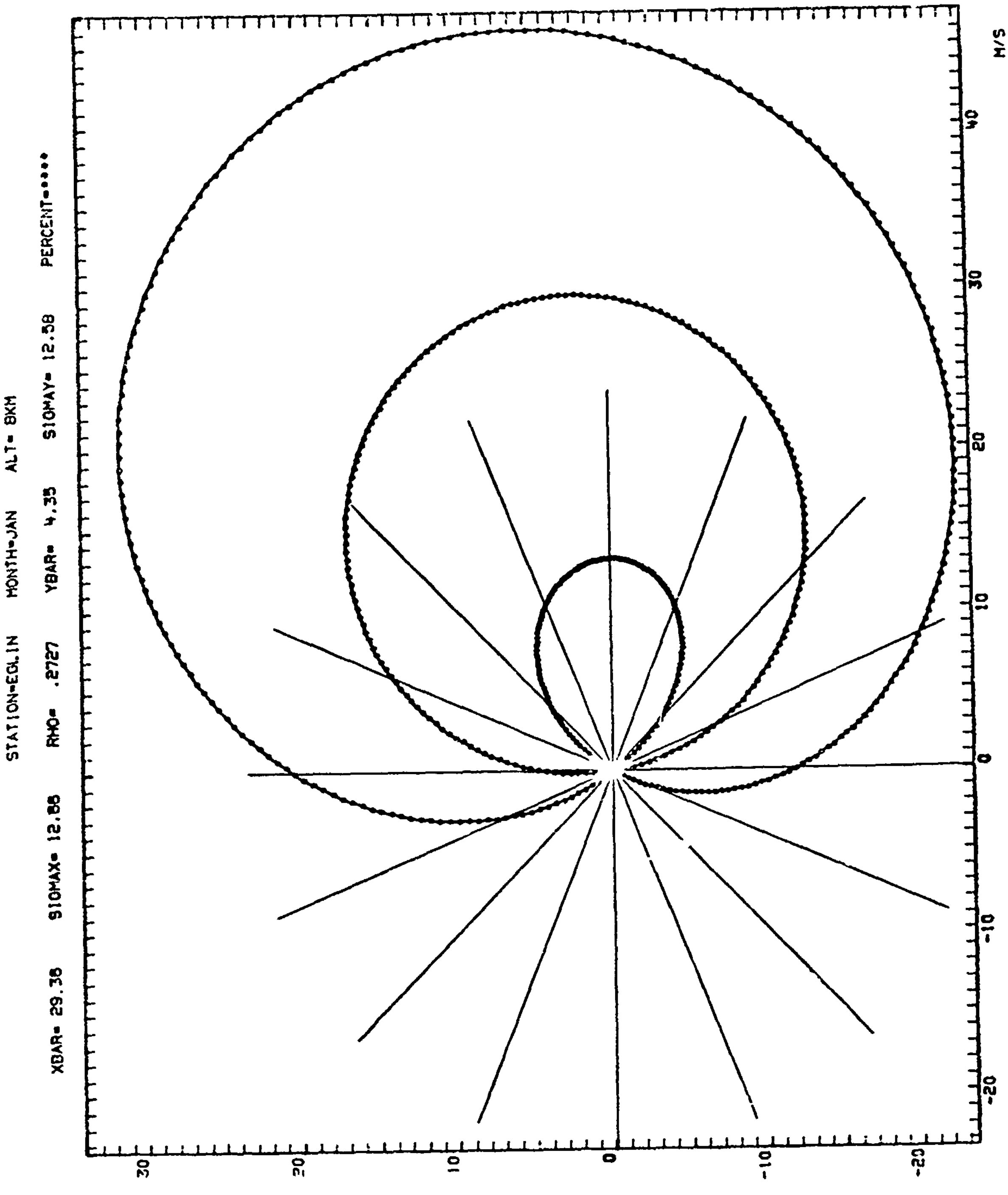

STATION=EGLIN MONTH=JAN ALT= 8KM
XBAR= 29.38 SIGMAX= 12.88 RHO= .2727 YBAR= 4.35 SIGMAY= 12.58 PERCENT=****
M/S
-20
-10
0
10
20
30
40
M/S
-20
-10
0
10
20
30

Fig. A-21

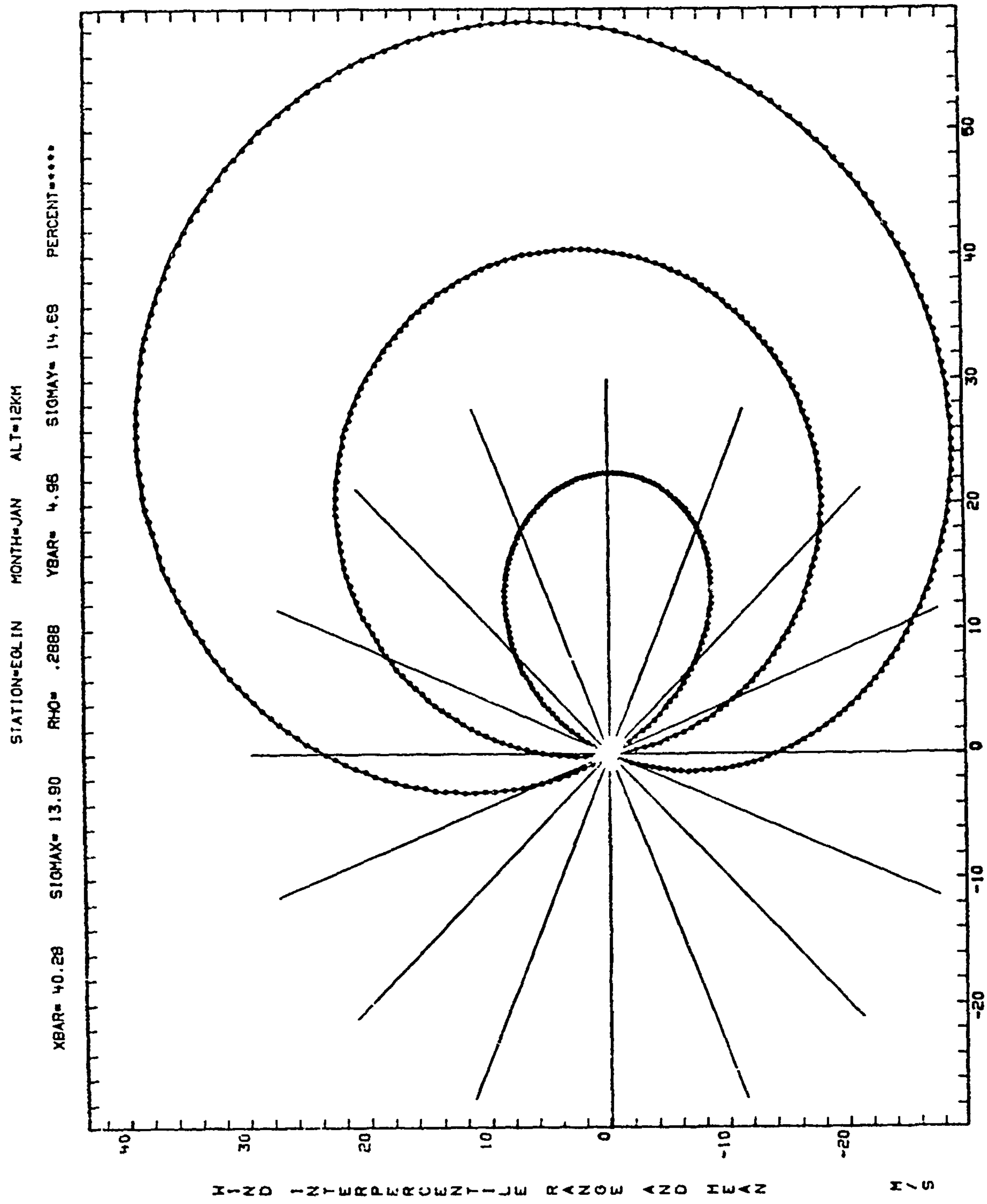

STATION=EGLIN MONTH=JAN ALT=12KM
XBAR= 40.28 SIGMAX= 13.90 RHO= .2888 YBAR= 4.96 SIGMAY= 14.68 PERCENT=****
40
30
20
10
0
-10
-20
WIND INTERPERCENTILE RANGE AND MEAN
M/S
-20
-10
0
10
20
30
40
50
M/S

Fig. A-22

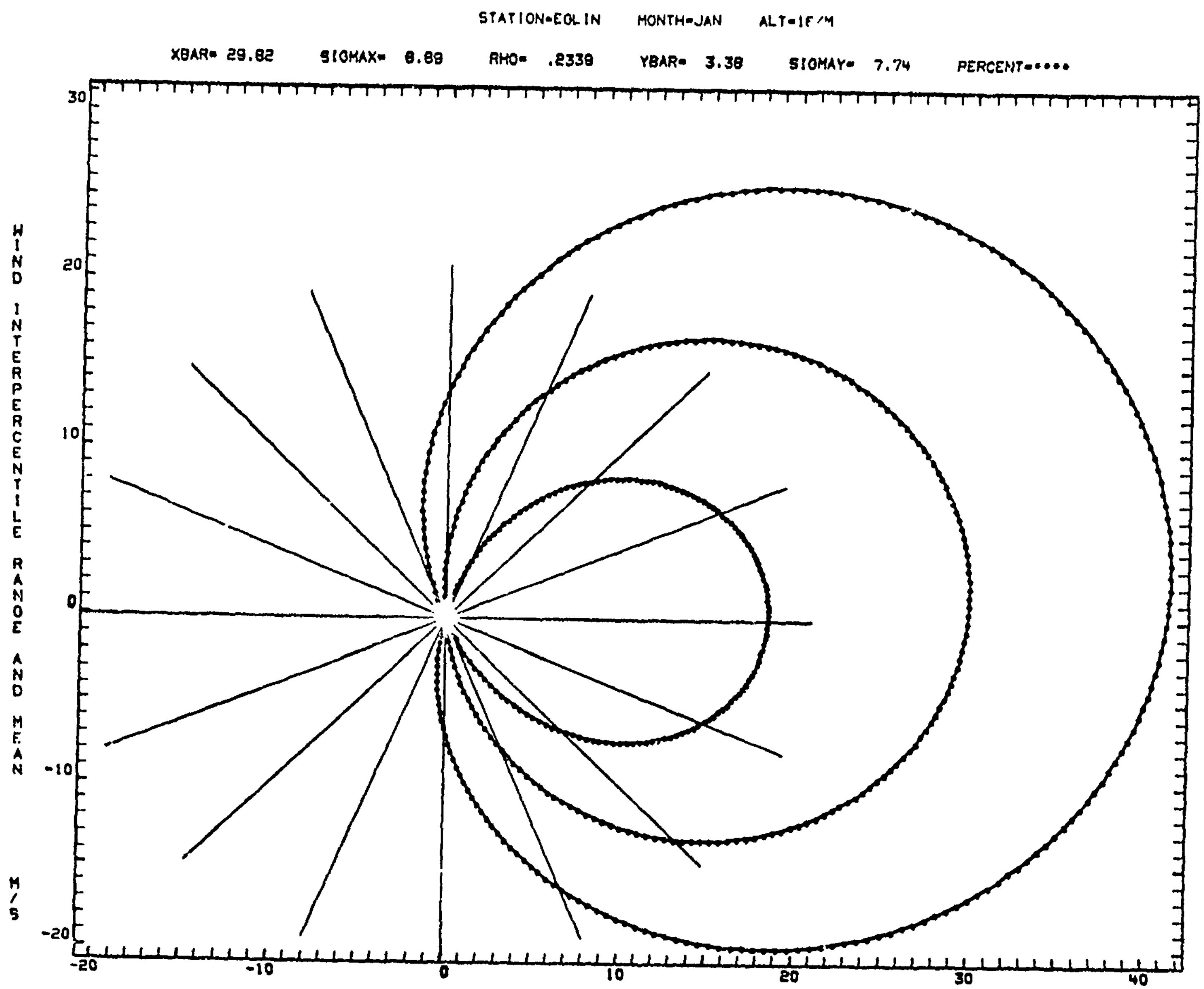
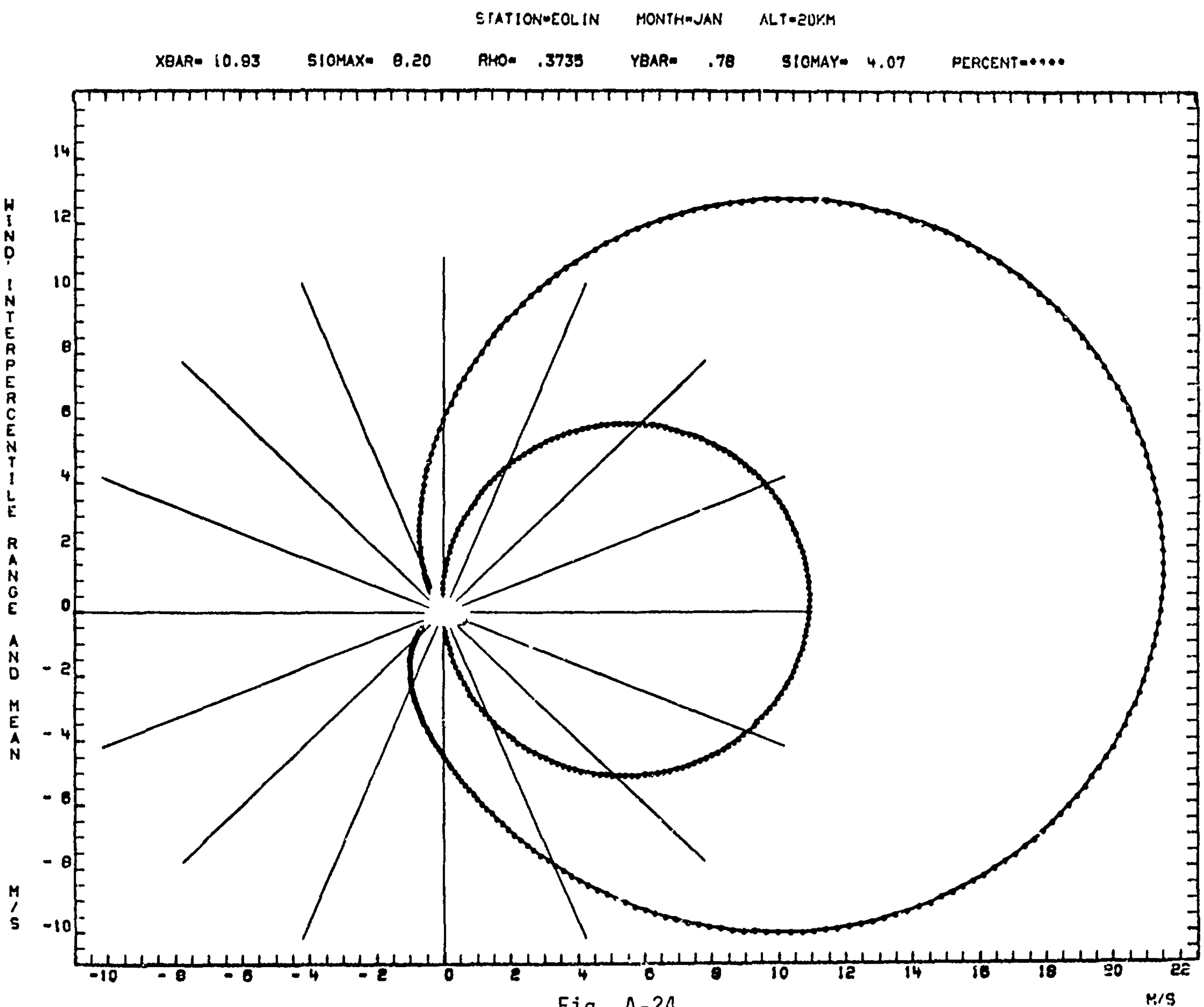

STATION=EOLIN MONTH=JAN ALT=1F/M
XBAR= 29.82 SIGMAX= 8.89 RHO= .2339 YBAR= 3.38 SIGMAY= 7.74 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
30
20
10
0
-10
-20
-20
-10
0
10
20
30
40
M/S

Fig. A-23



STATION=EOLIN MONTH=JAN ALT=20KM
XBAR= 10.93 SIGMAX= 8.20 RHO= .3735 YBAR= .78 SIGMAY= 4.07 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16 18 20 22
M/S

Fig. A-24

STATION=EGLIN MONTH=JAN ALT=24KM

XBAR= 7.30 SIGMAX= 3.80 RHO= .3857 YBAR= .54 SIGMAY= 3.74 PERCENT=****

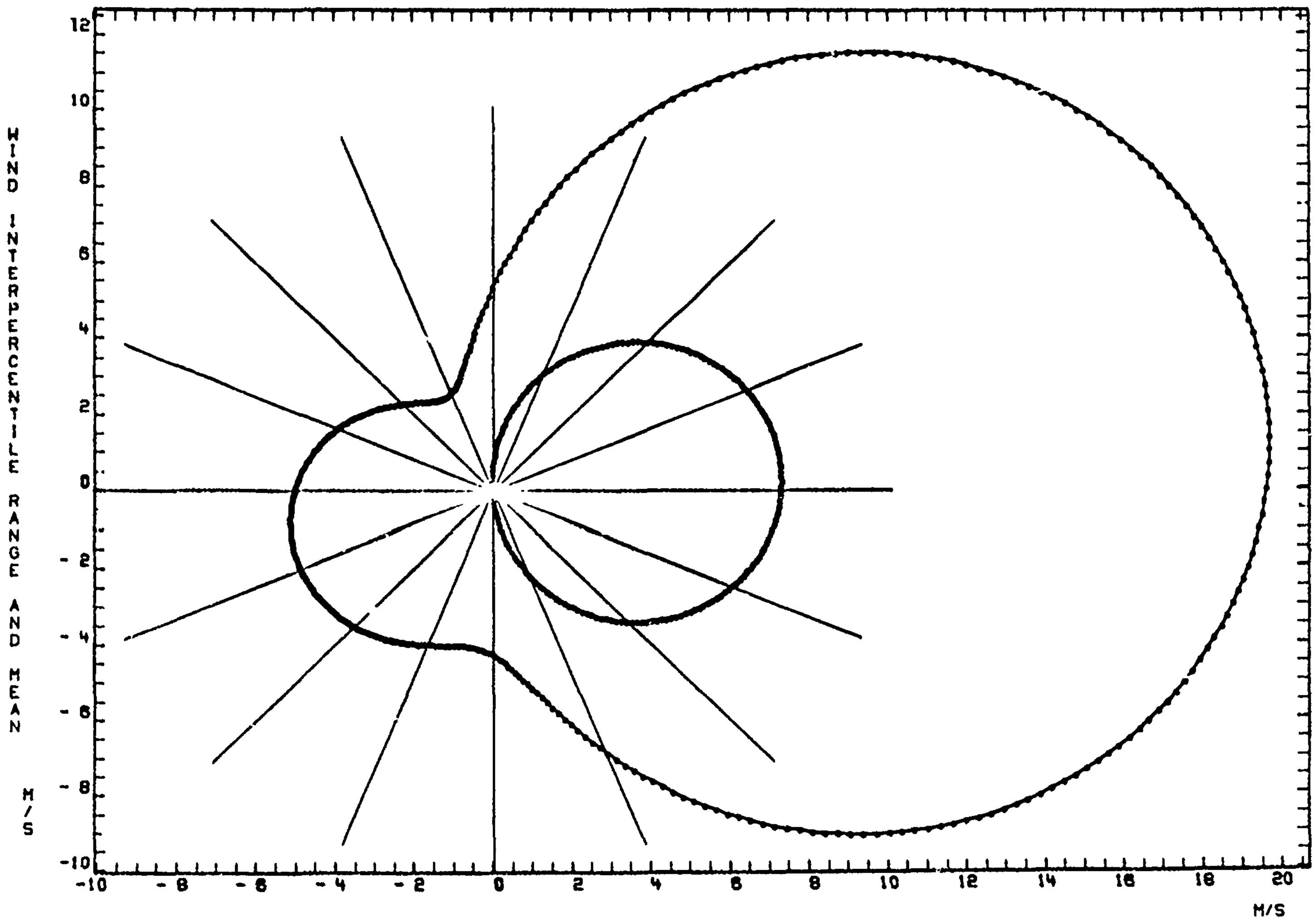


Fig. A-25

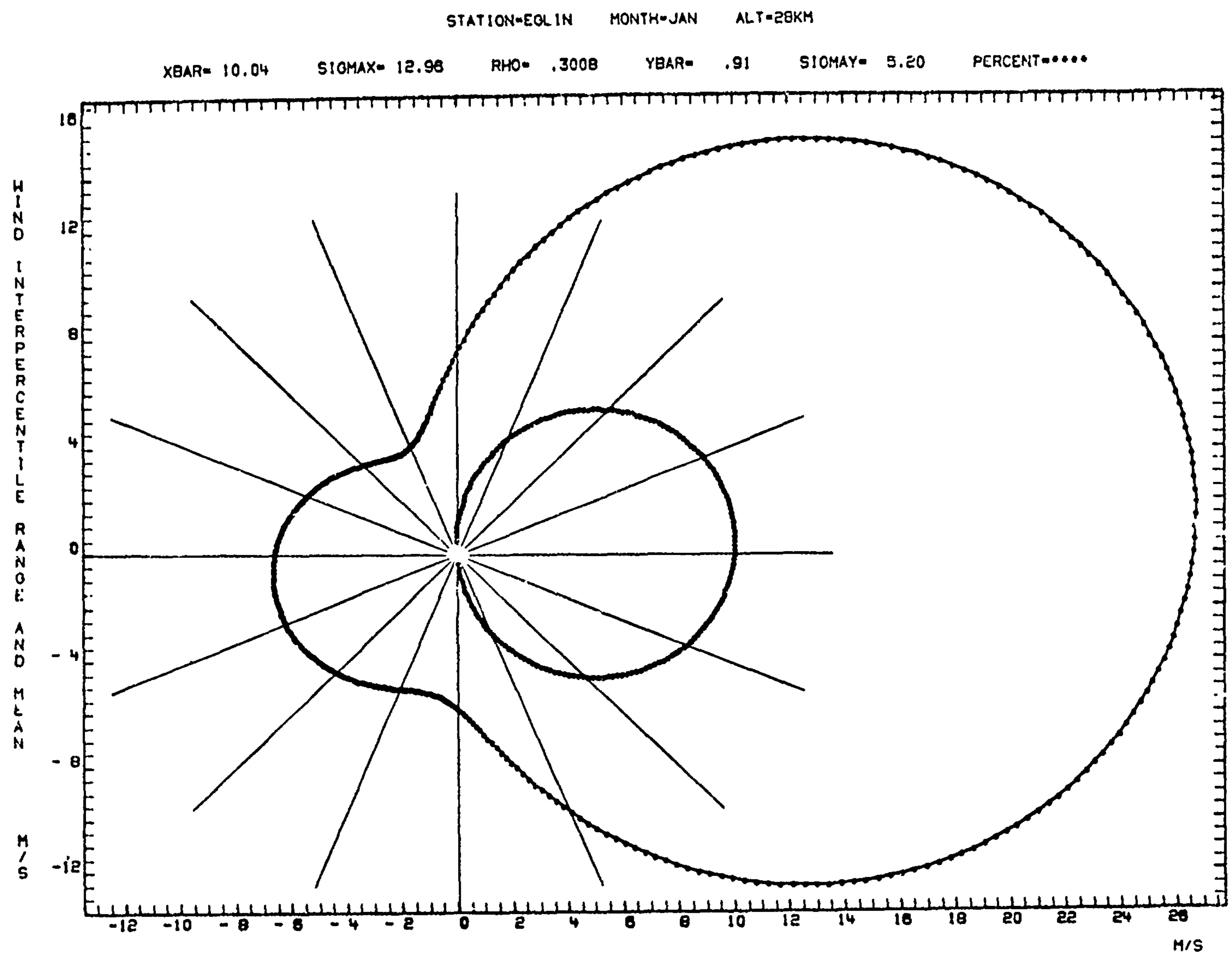

STATION=EGLIN MONTH=JAN ALT=28KM
XBAR= 10.04 SIGMAX= 12.96 RHO= .3008 YBAR= .91 SIGMAY= 5.20 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
16
12
8
4
0
-4
-8
-12
-12
-10
-8
-6
-4
-2
0
2
4
6
8
10
12
14
16
18
20
22
24
26
M/S

Fig. A-26

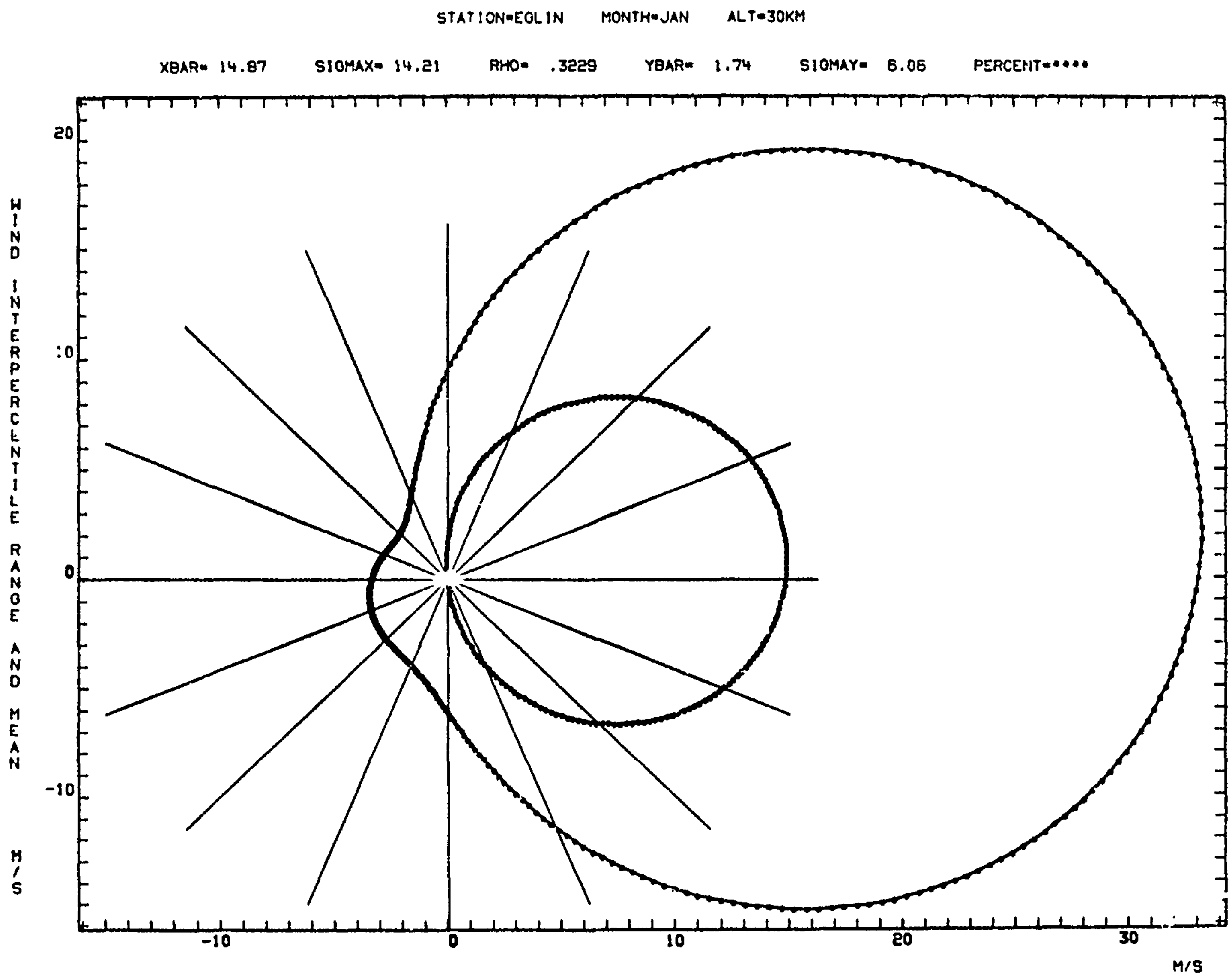

STATION=EGLIN MONTH=JAN ALT=30KM
XBAR= 14.87 SIGMAX= 14.21 RHO= .3229 YBAR= 1.74 SIGMAY= 6.06 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN M/S
20
:0
0
-10
-10
0
10
20
30
M/S

Fig. A-27

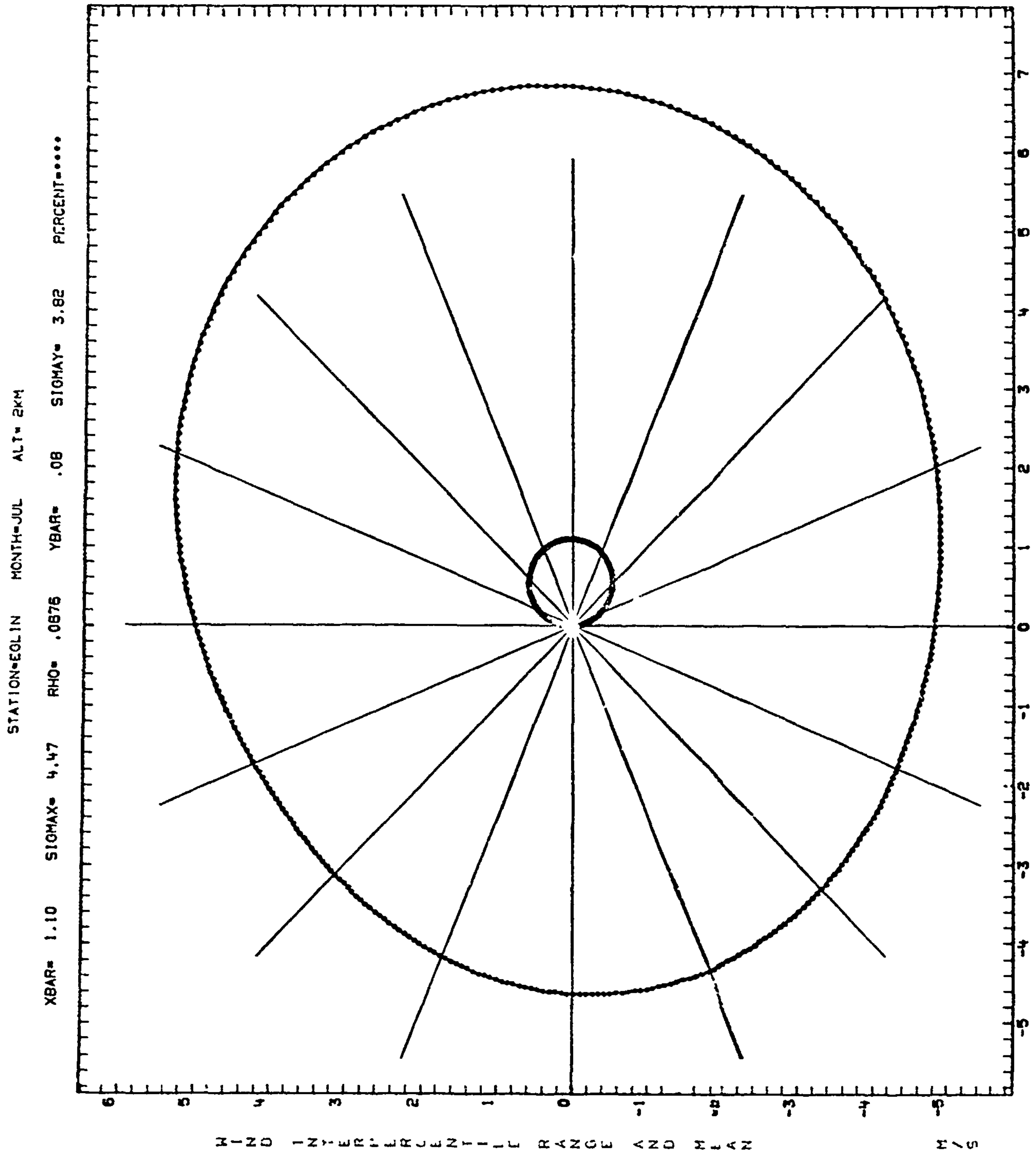

STATION=EGLIN MONTH=JUL ALT= 2KM
XBAR= 1.10 SIGMAX= 4.47 RHO= .0876 YBAR= .08 SIGMAY= 3.82 PERCENT=****
M/S

Fig. A-28

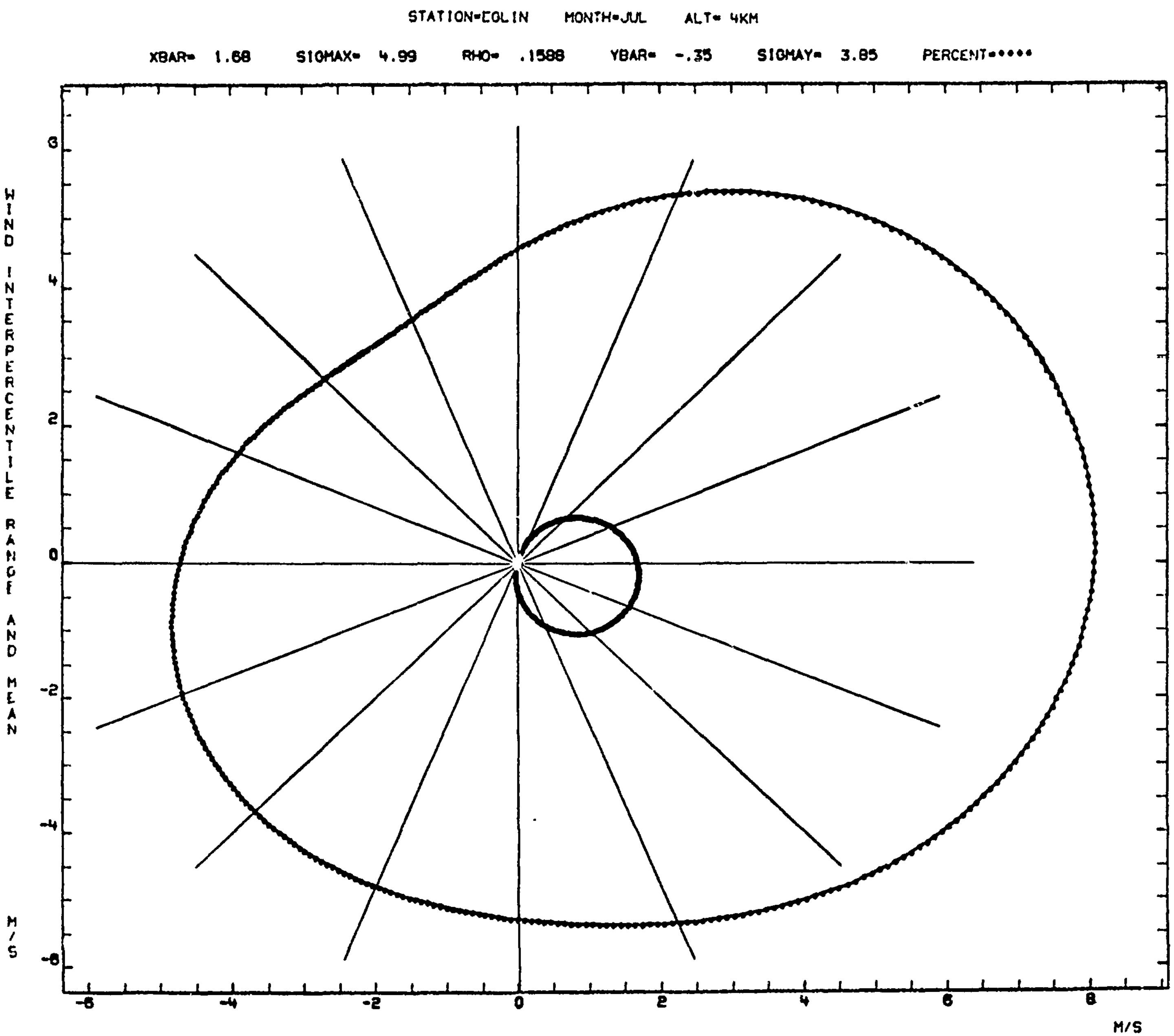
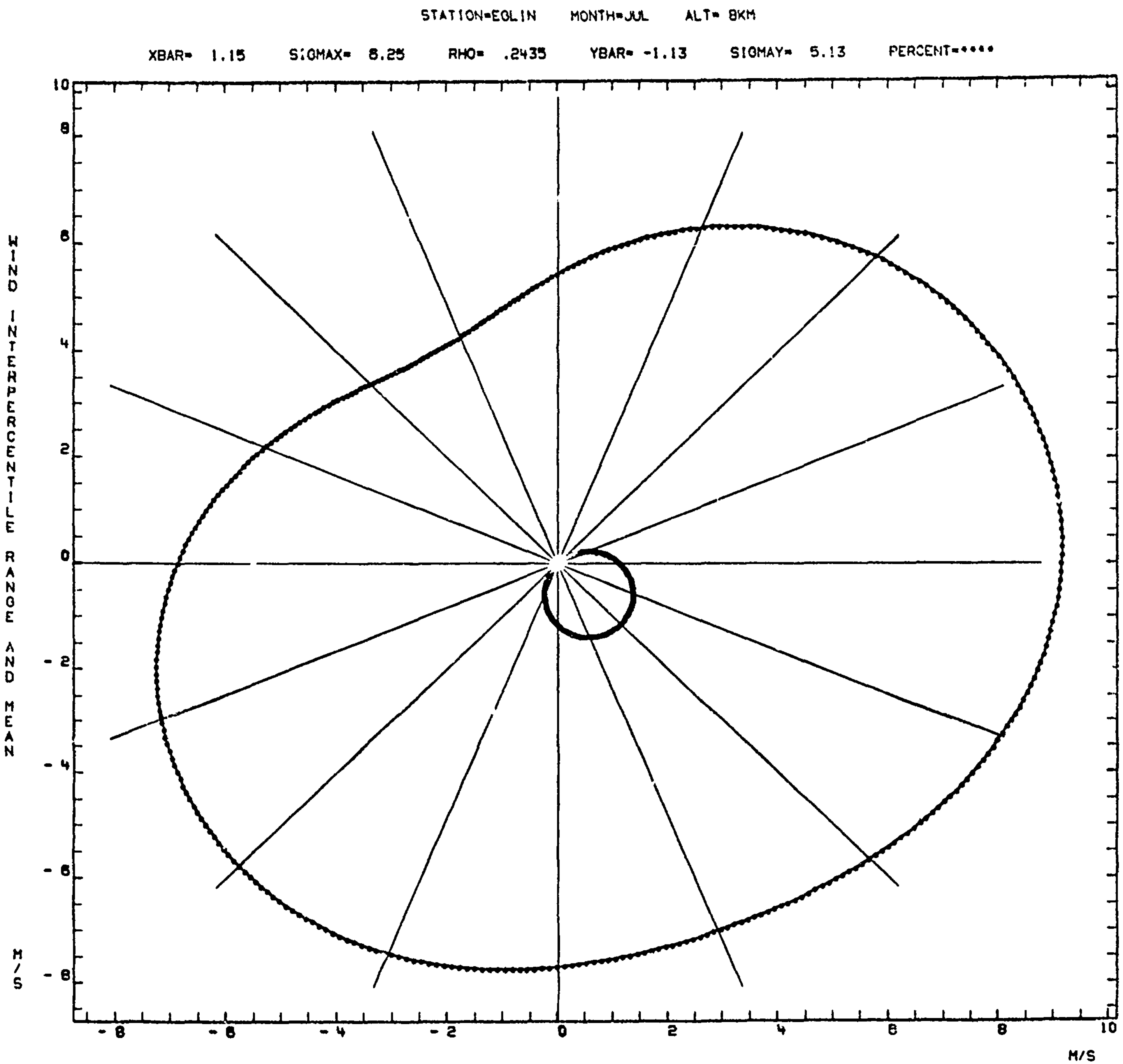

STATION=EGLIN MONTH=JUL ALT= 4KM
XBAR= 1.68 SIGMAX= 4.99 RHO= .1588 YBAR= -.35 SIGMAY= 3.85 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
6
4
2
0
-2
-4
-6
-6
-4
-2
0
2
4
6
8
M/S

Fig. A-29



STATION=EGLIN MONTH=JUL ALT= 8KM
XBAR= 1.15 SIGMAX= 6.25 RHO= .2435 YBAR= -1.13 SIGMAY= 5.13 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
M/S

Fig. A-30

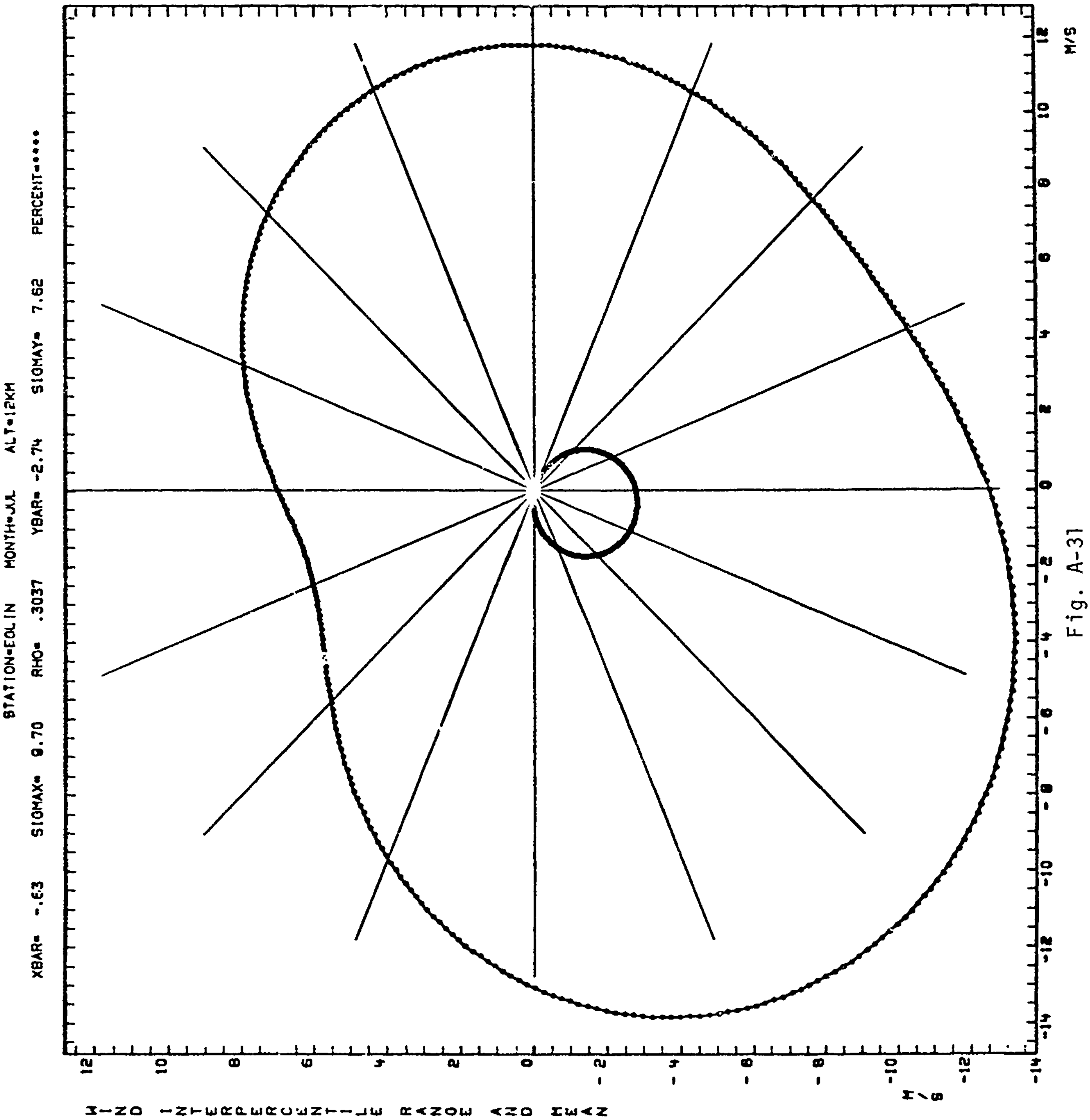

STATION=EOLIN MONTH=JUL ALT=12KM
XBAR= -.63 SIGMAX= 9.70 RHO= .3037 YBAR= -2.74 SIGMAY= 7.62 PERCENT=****
M/S
M/S

Fig. A-31

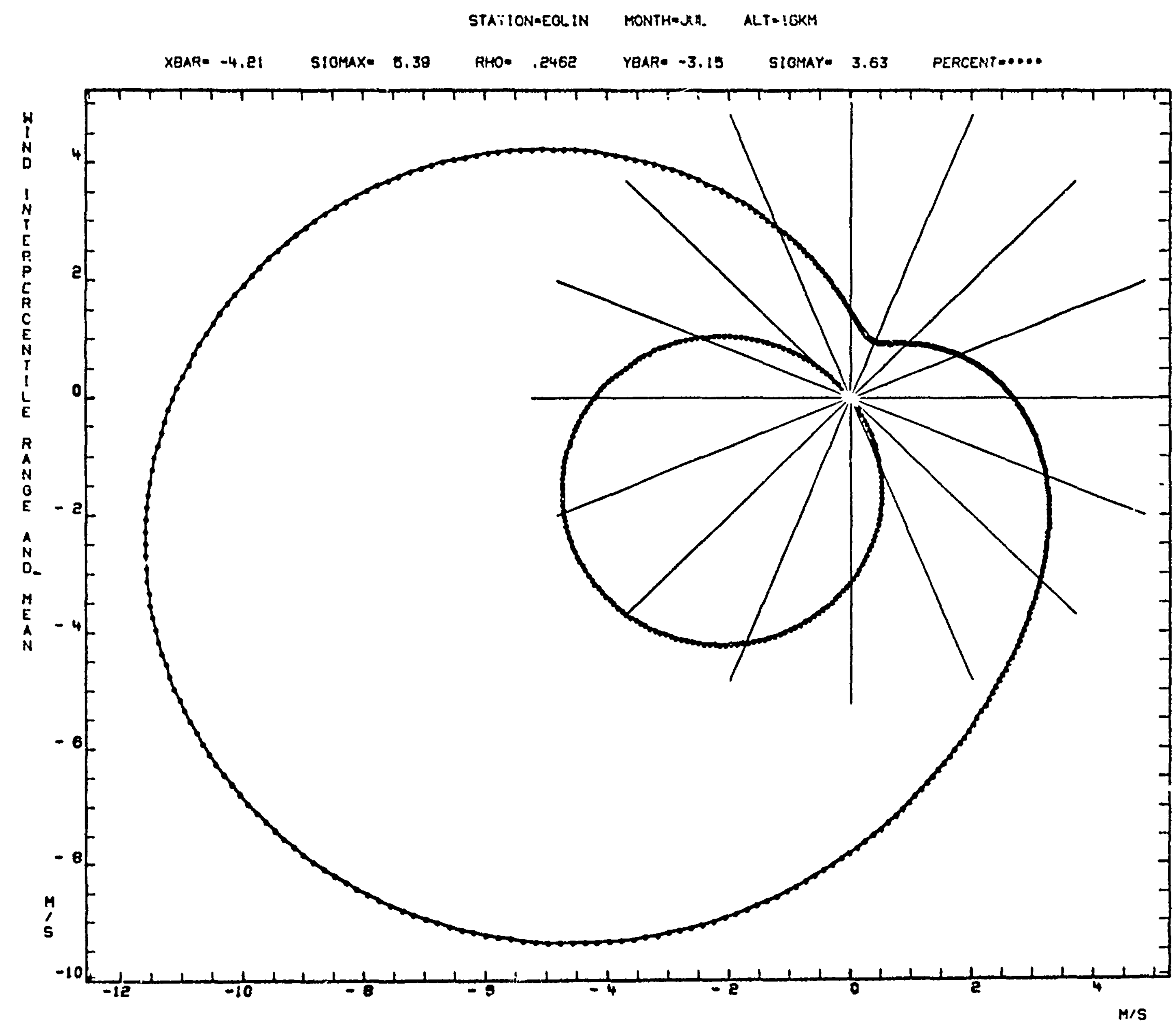

STATION=EGLIN MONTH=JUL ALT=16KM
XBAR= -4.21 SIGMAX= 5.39 RHO= .2462 YBAR= -3.15 SIGMAY= 3.63 PERCENT=*****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
M/S

Fig. A-32

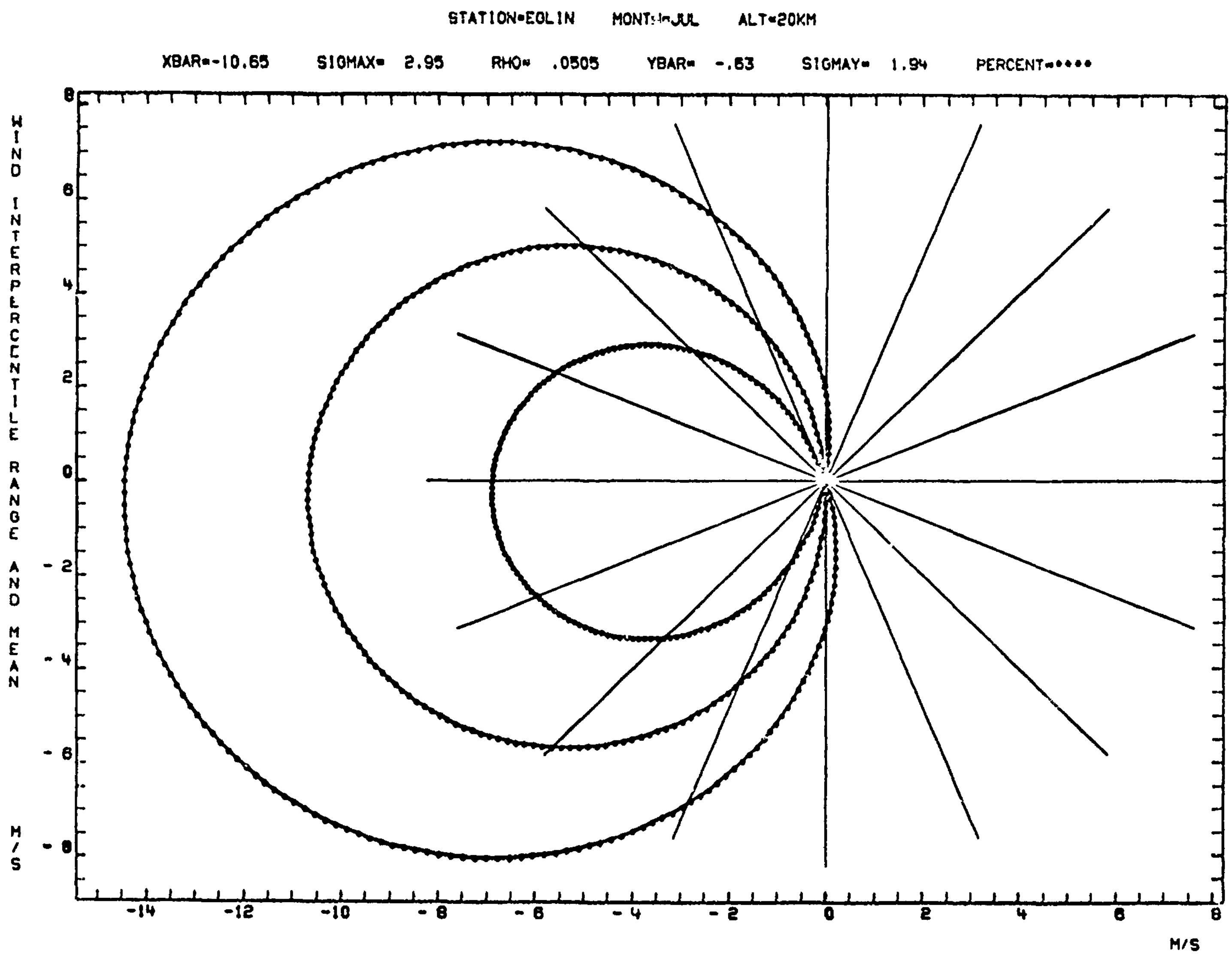

STATION=EGLIN MONTH=JUL ALT=20KM
XBAR=-10.65 SIGMAX= 2.95 RHO= .0505 YBAR= -.63 SIGMAY= 1.94 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
8
6
4
2
0
-2
-4
-6
-8
-14
-12
-10
-8
-6
-4
-2
0
2
4
6
8
M/S

Fig. A-33

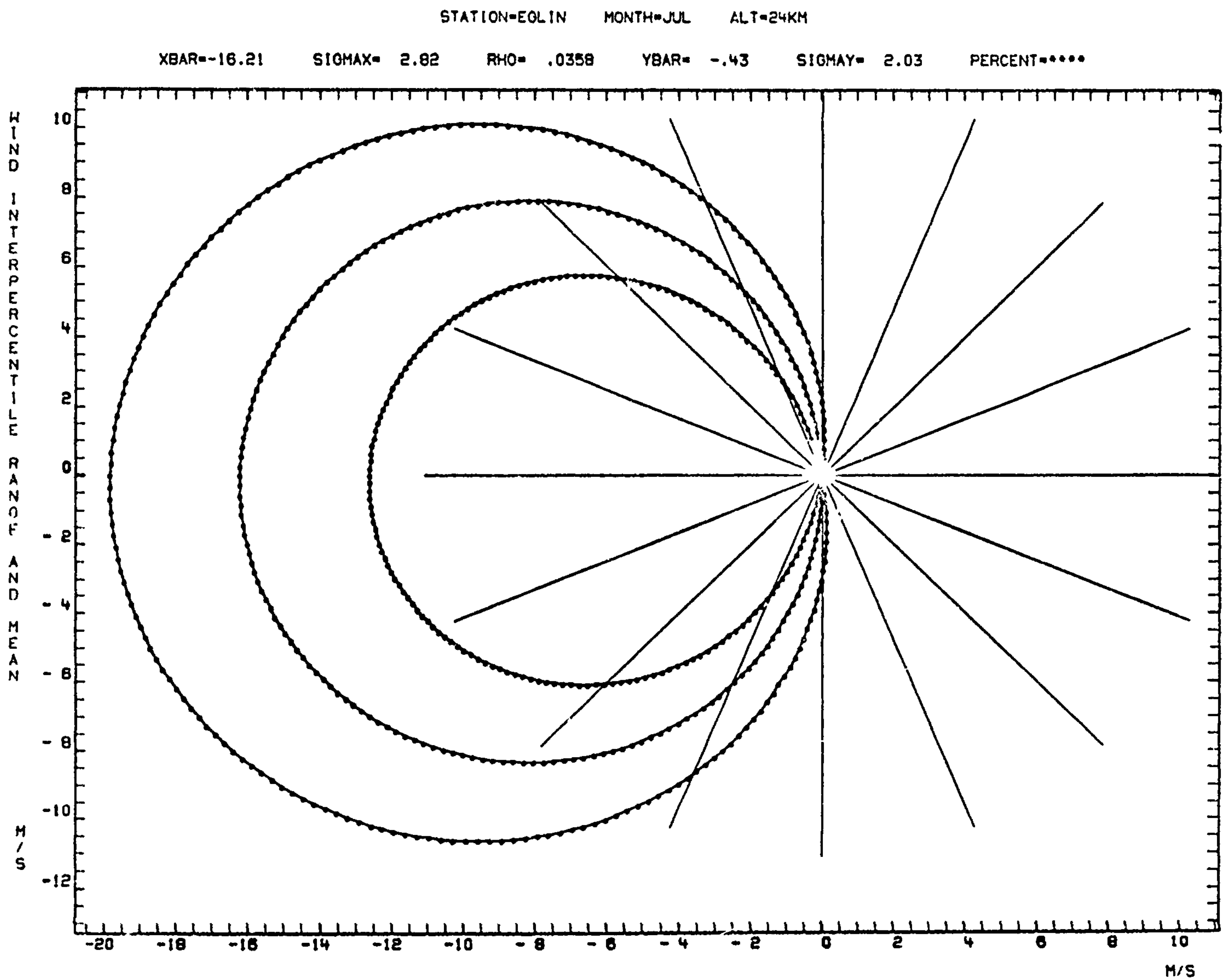

STATION=EGLIN MONTH=JUL ALT=24KM
XBAR=-16.21 SIGMAX= 2.82 RHO= .0358 YBAR= -.43 SIGMAY= 2.03 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
M/S

Fig. A-34

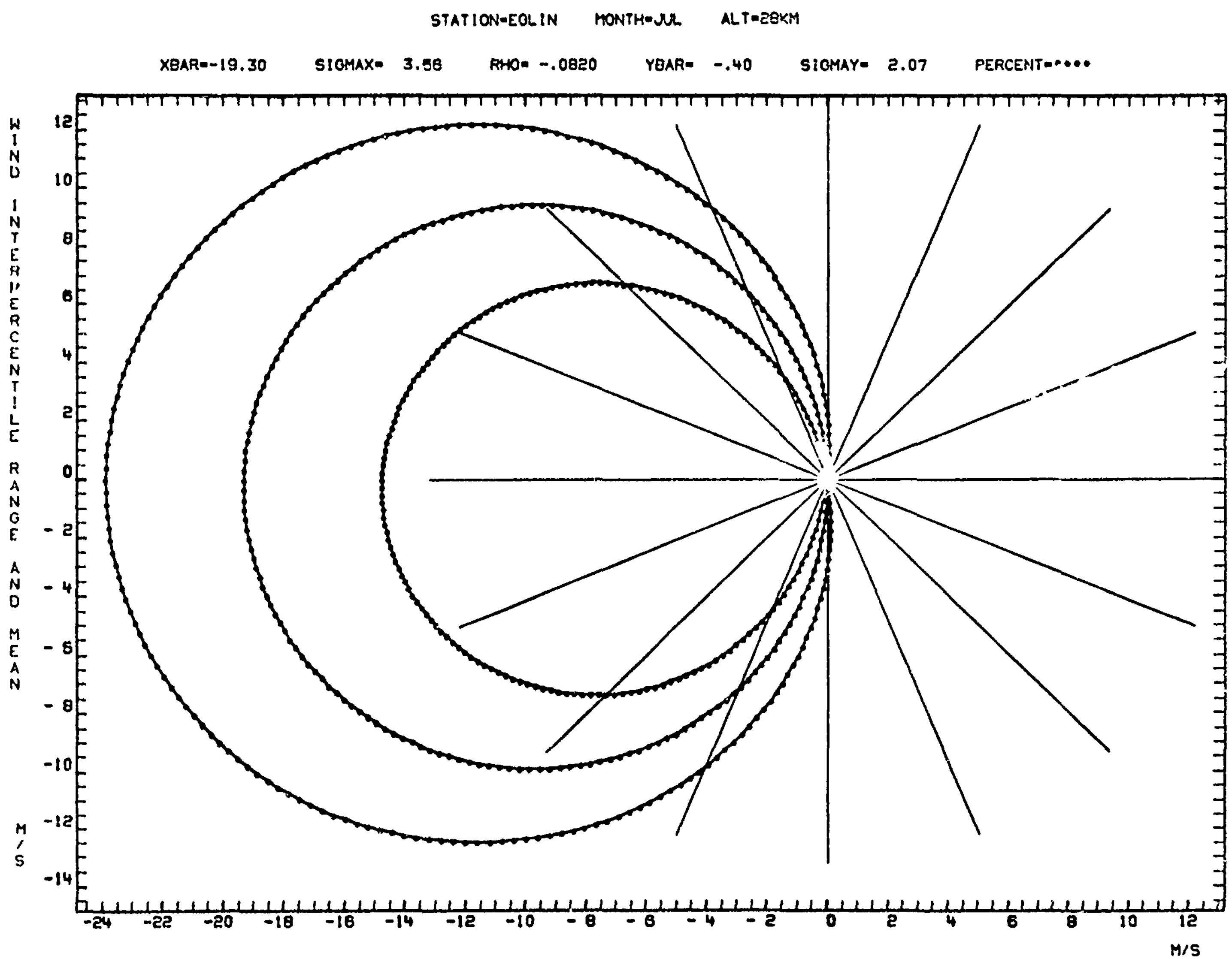
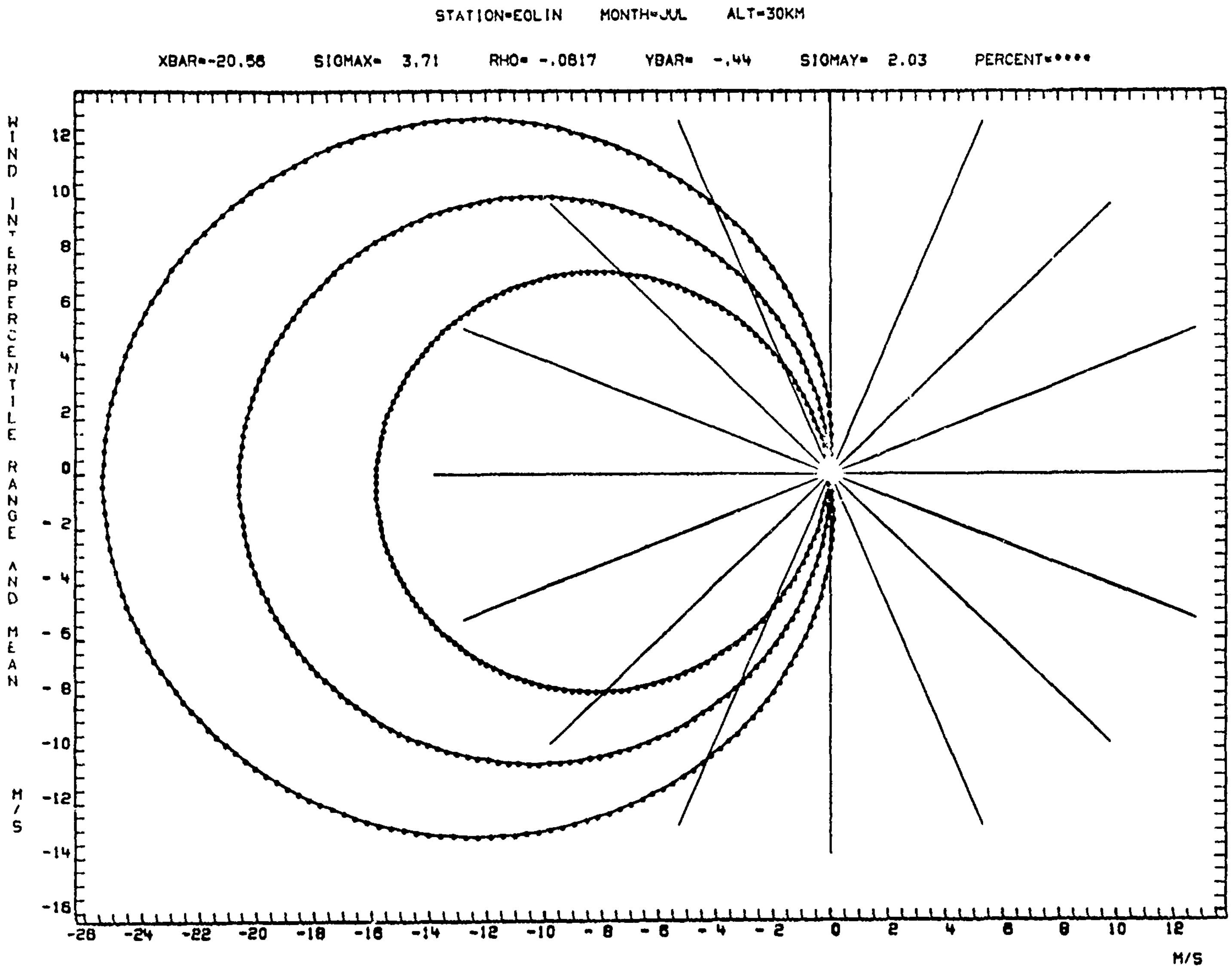
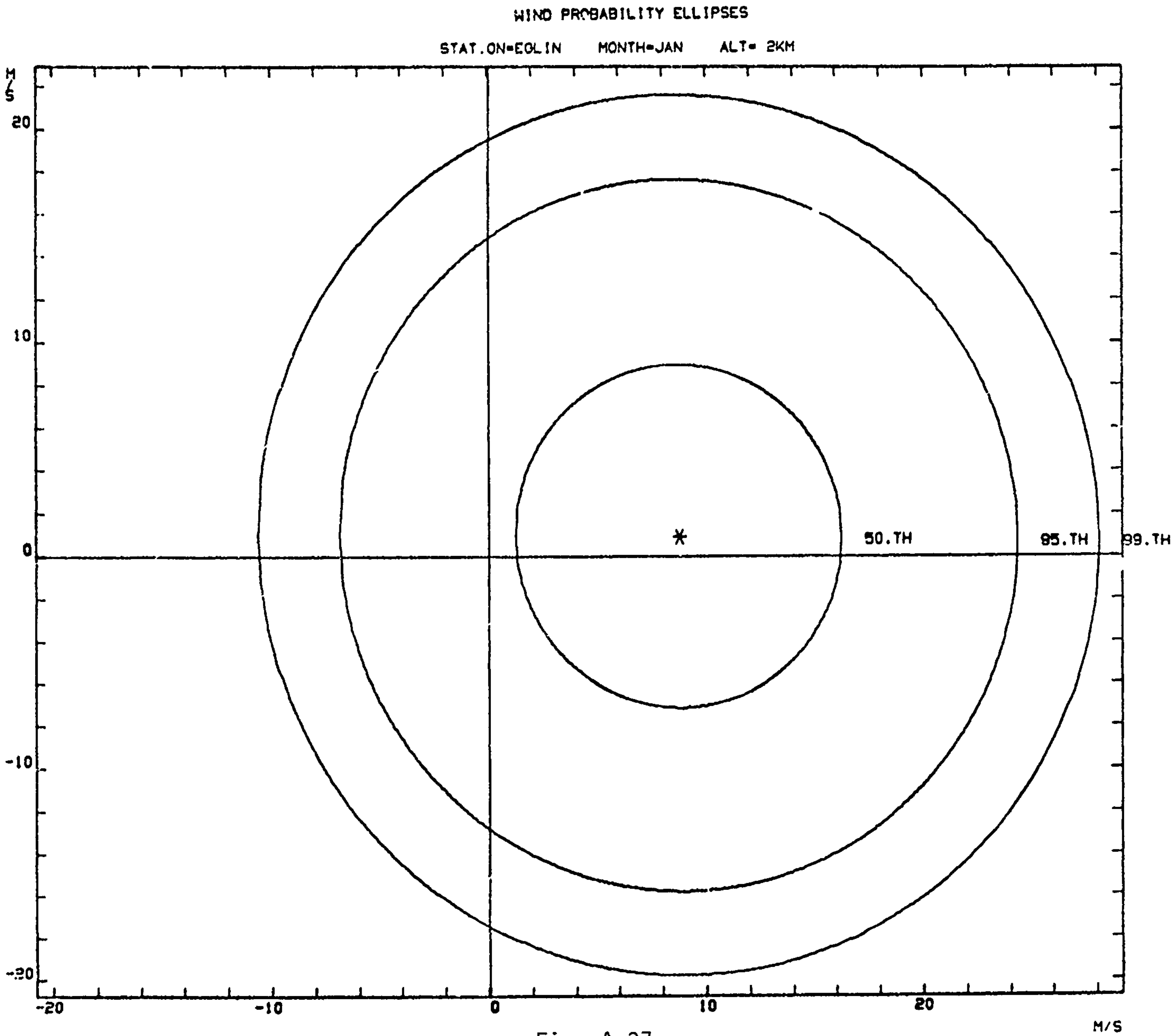

STATION=EGLIN MONTH=JUL ALT=28KM
XBAR=-19.30 SIGMAX= 3.56 RHO= -.0820 YBAR= -.40 SIGMAY= 2.07 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-24 -22 -20 -18 -16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12
M/S

Fig. A-35



STATION=EOLIN MONTH=JUL ALT=30KM
XBAR=-20.56 SIGMAX= 3.71 RHO= -.0817 YBAR= -.44 SIGMAY= 2.03 PERCENT=****
WIND INTERPERCENTILE RANGE AND MEAN
M/S
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-28
-24
-22
-20
-18
-16
-14
-12
-10
-8
-6
-4
-2
0
2
4
6
8
10
12
M/S

Fig. A-36



WIND PROBABILITY ELLIPSES
STAT.ON=EGLIN MONTH=JAN ALT= 2KM
M/S
20
10
0
-10
-20
-20
-10
0
10
20
M/S
50.TH
95.TH
99.TH

Fig. A-37

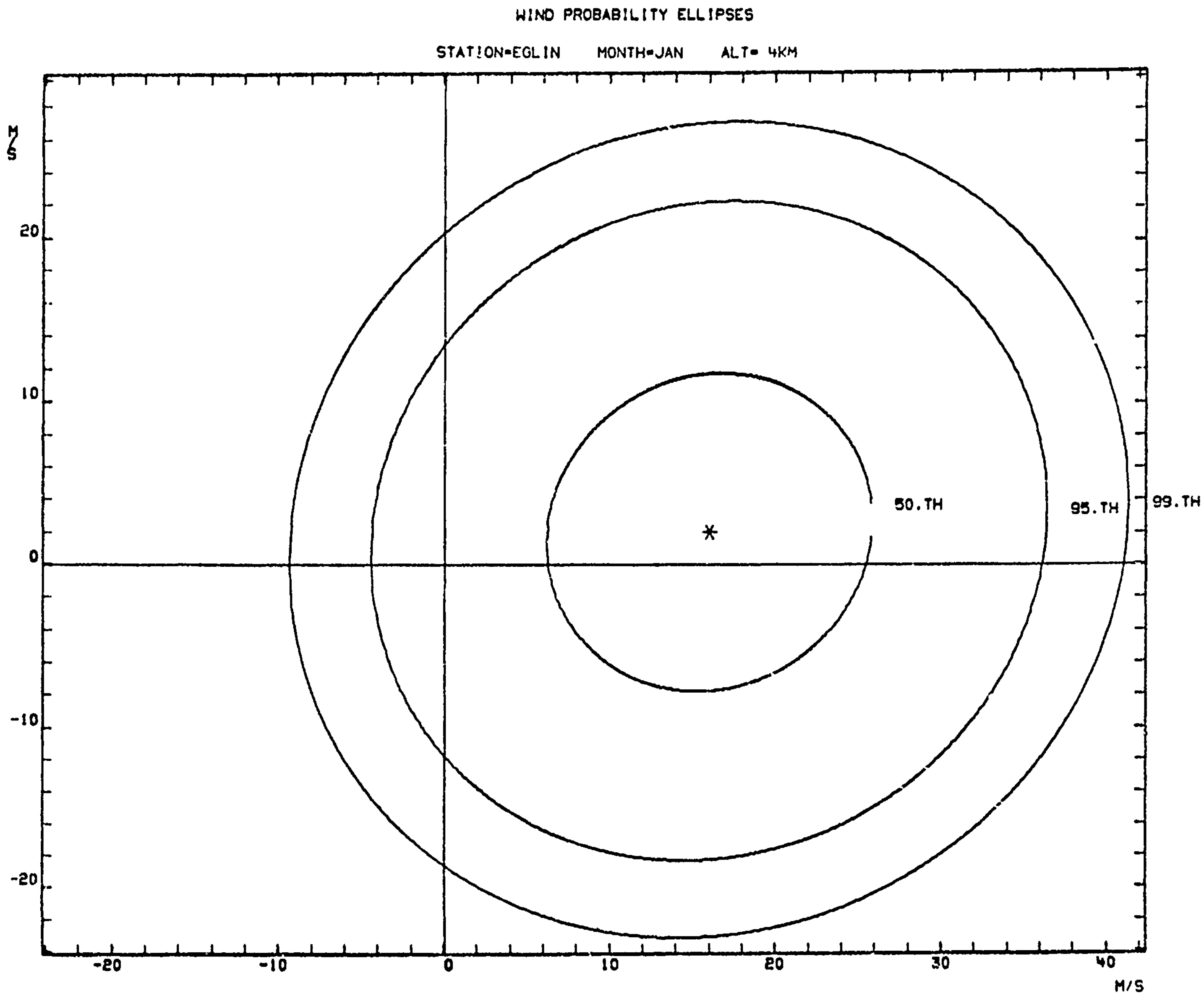
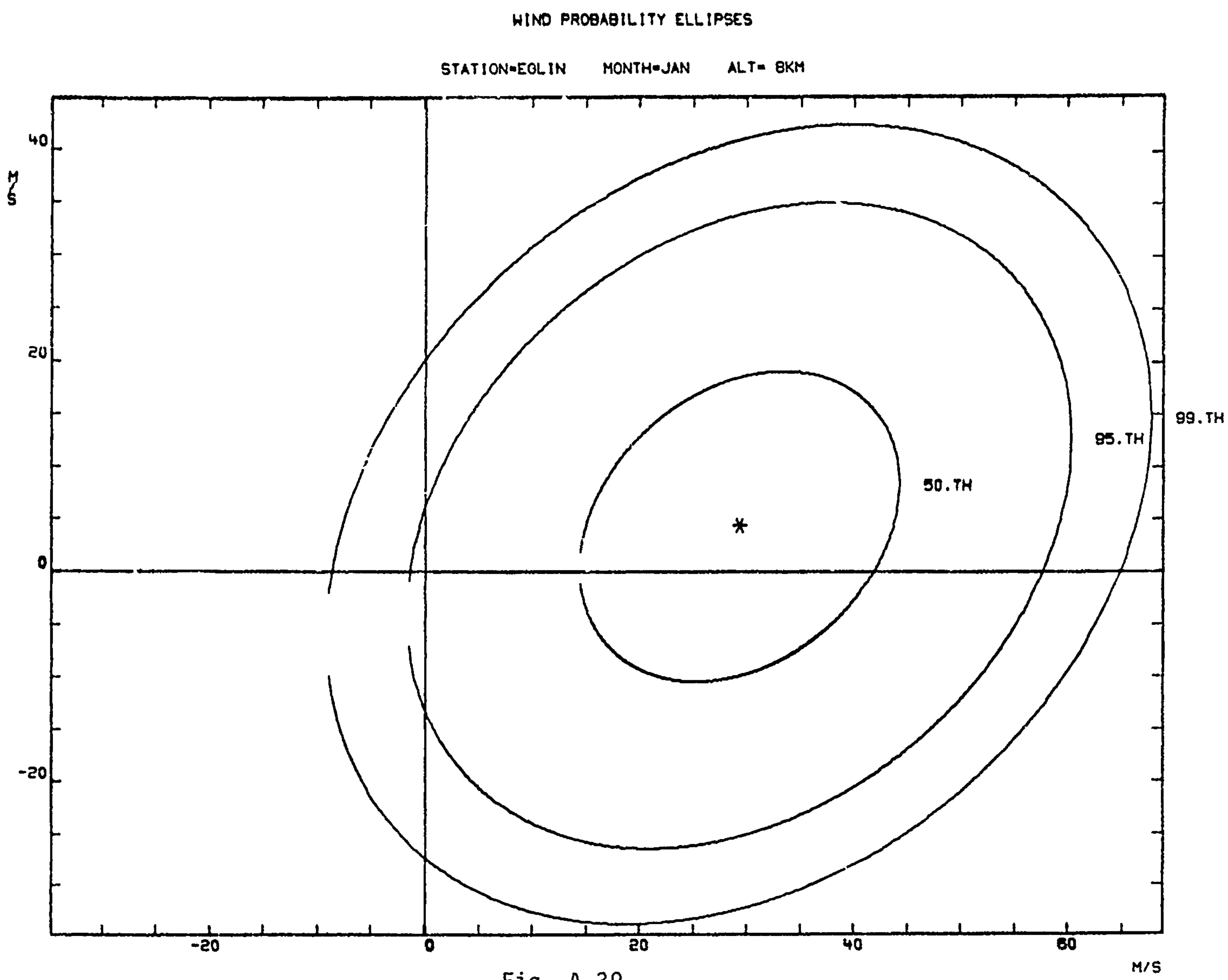
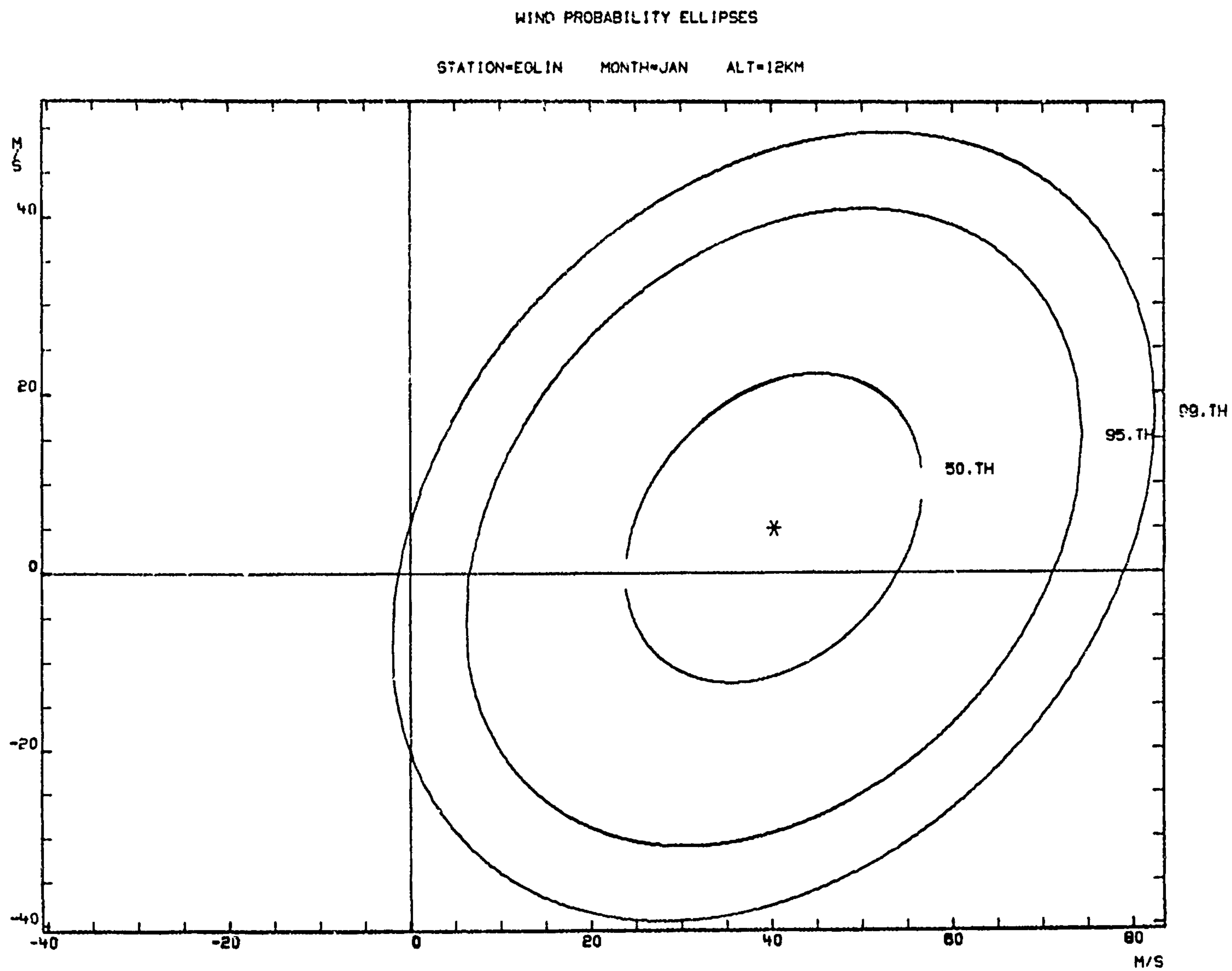

WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JAN ALT= 4KM
M/S
20
10
0
-10
-20
-20
-10
0
10
20
30
40
M/S
50.TH
95.TH
99.TH

Fig. A-38



WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JAN ALT= 8KM
40
M/S
20
0
-20
-20
0
20
40
60
M/S
50.TH
85.TH
99.TH

Fig. A-39



WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JAN ALT=12KM
M/S
40
20
0
-20
-40
-40
-20
0
20
40
60
80
M/S
50.TH
95.TH
99.TH

Fig. A-40

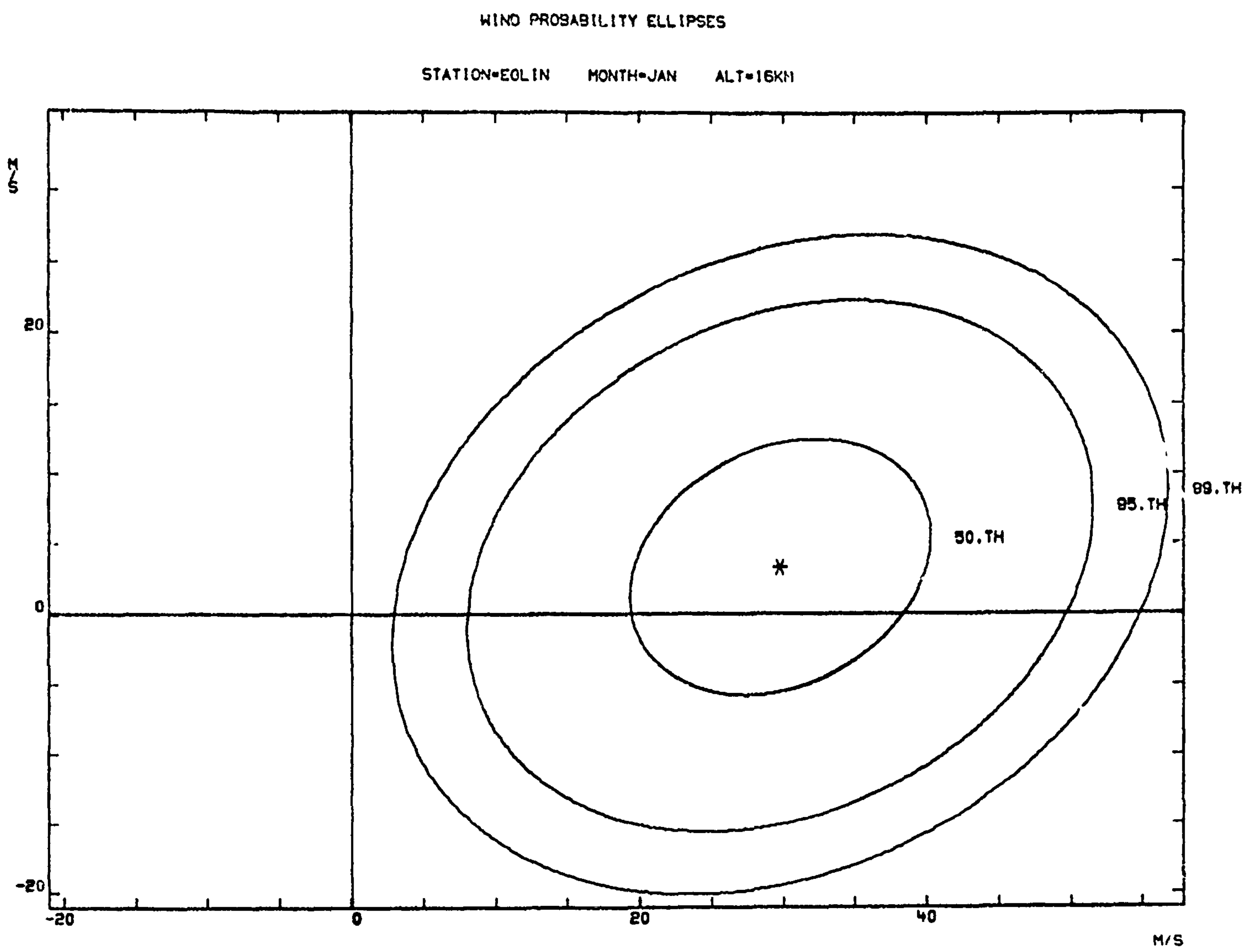

WIND PROBABILITY ELLIPSES
STATION=EOLIN MONTH=JAN ALT=16KM
M/S
20
0
-20
-20
0
20
40
M/S
50.TH
95.TH
99.TH

Fig. A-41

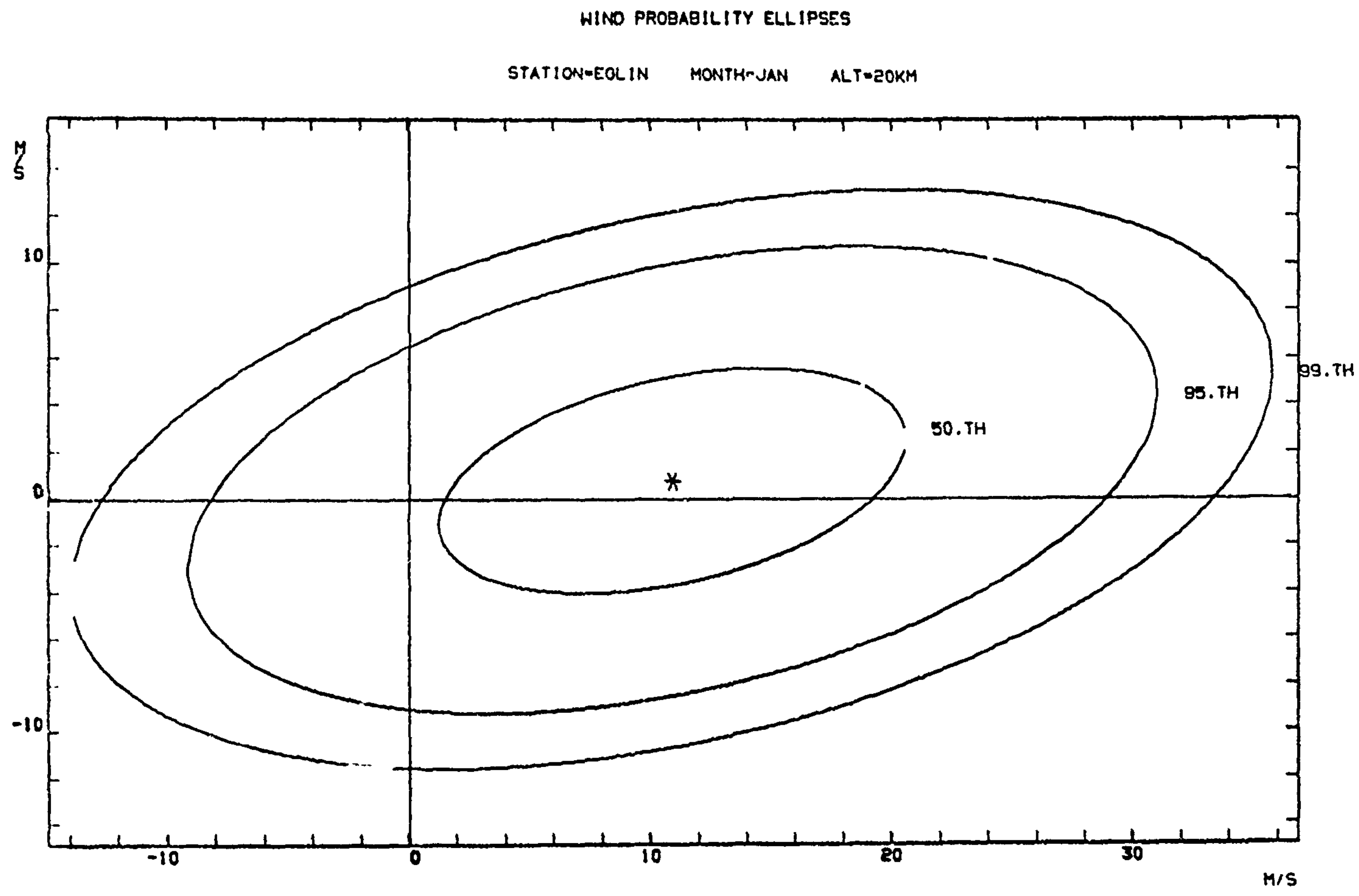

WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JAN ALT=20KM
M/S
10
0
-10
-10
0
10
20
30
M/S
50.TH
95.TH
99.TH

Fig. A-42

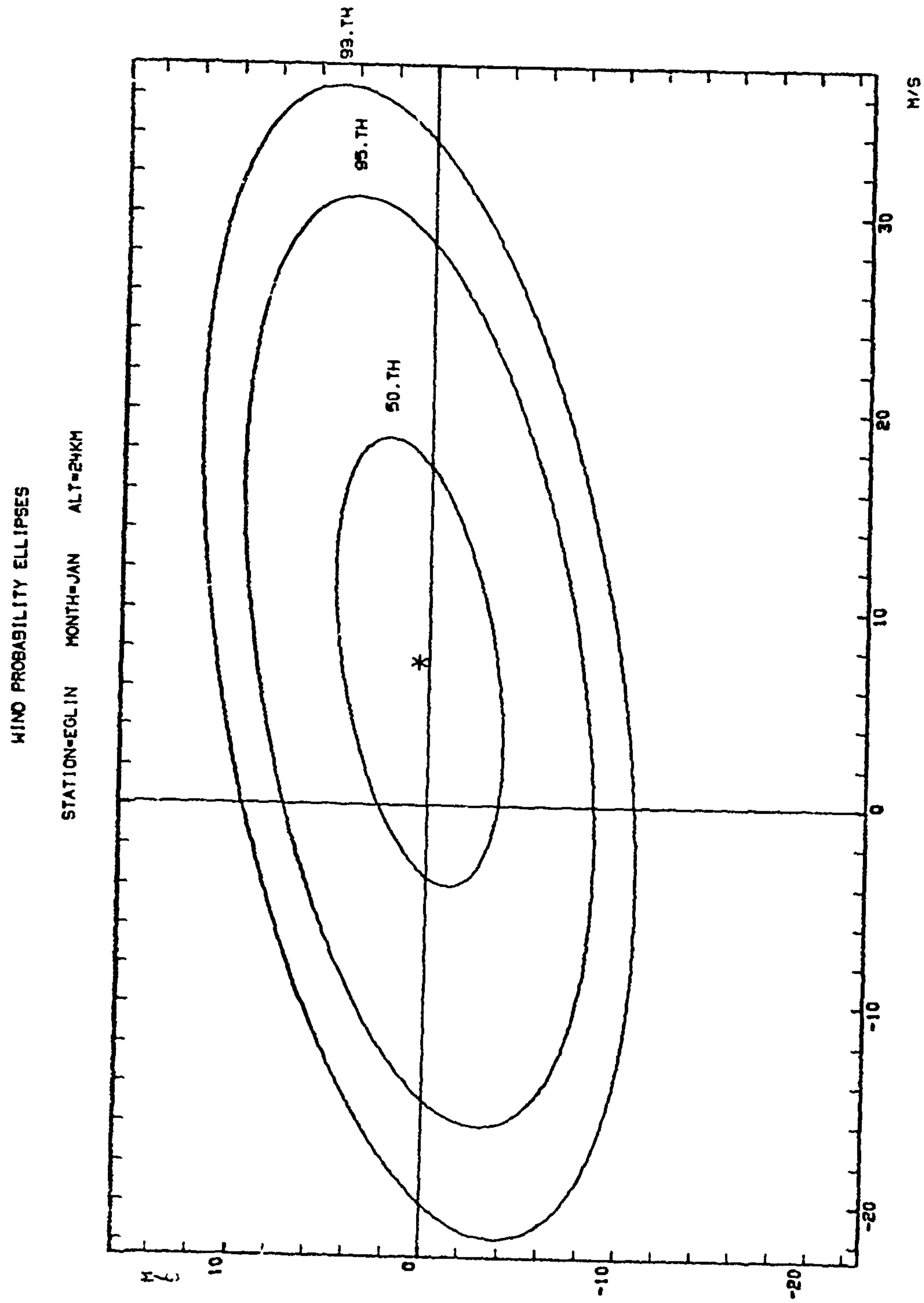

WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JAN ALT=24KM
99.TH
95.TH
50.TH
M/S
M/S
30
20
10
0
-10
-20
10
0
-10
-20

Fig. A-43

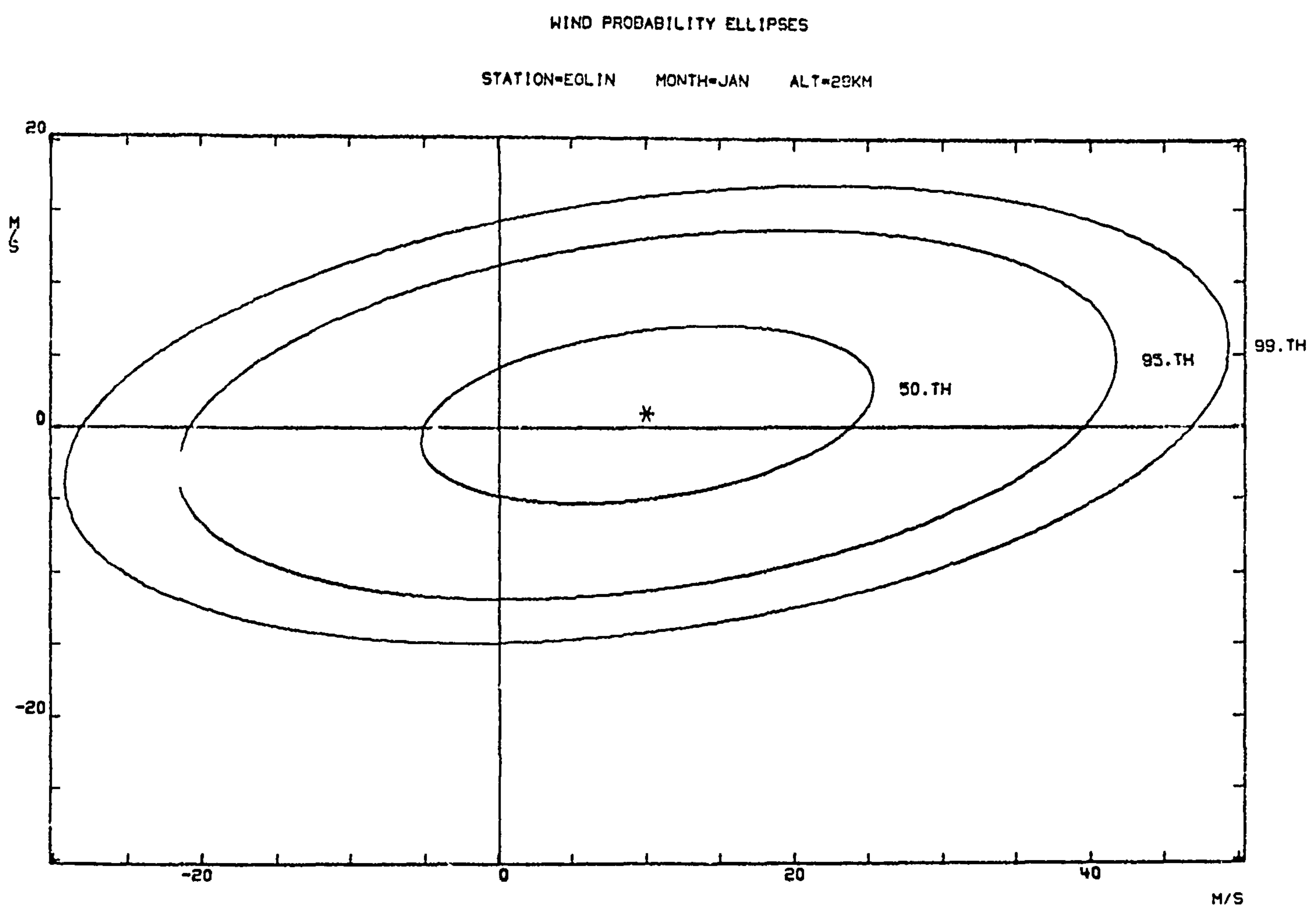

WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JAN ALT=28KM
20
0
-20
M/S
-20
0
20
40
M/S
50.TH
95.TH
99.TH

Fig. A-44

WIND PROBABILITY ELLIPSES

STATION=EGLIN MONTH=JAN ALT=30KM

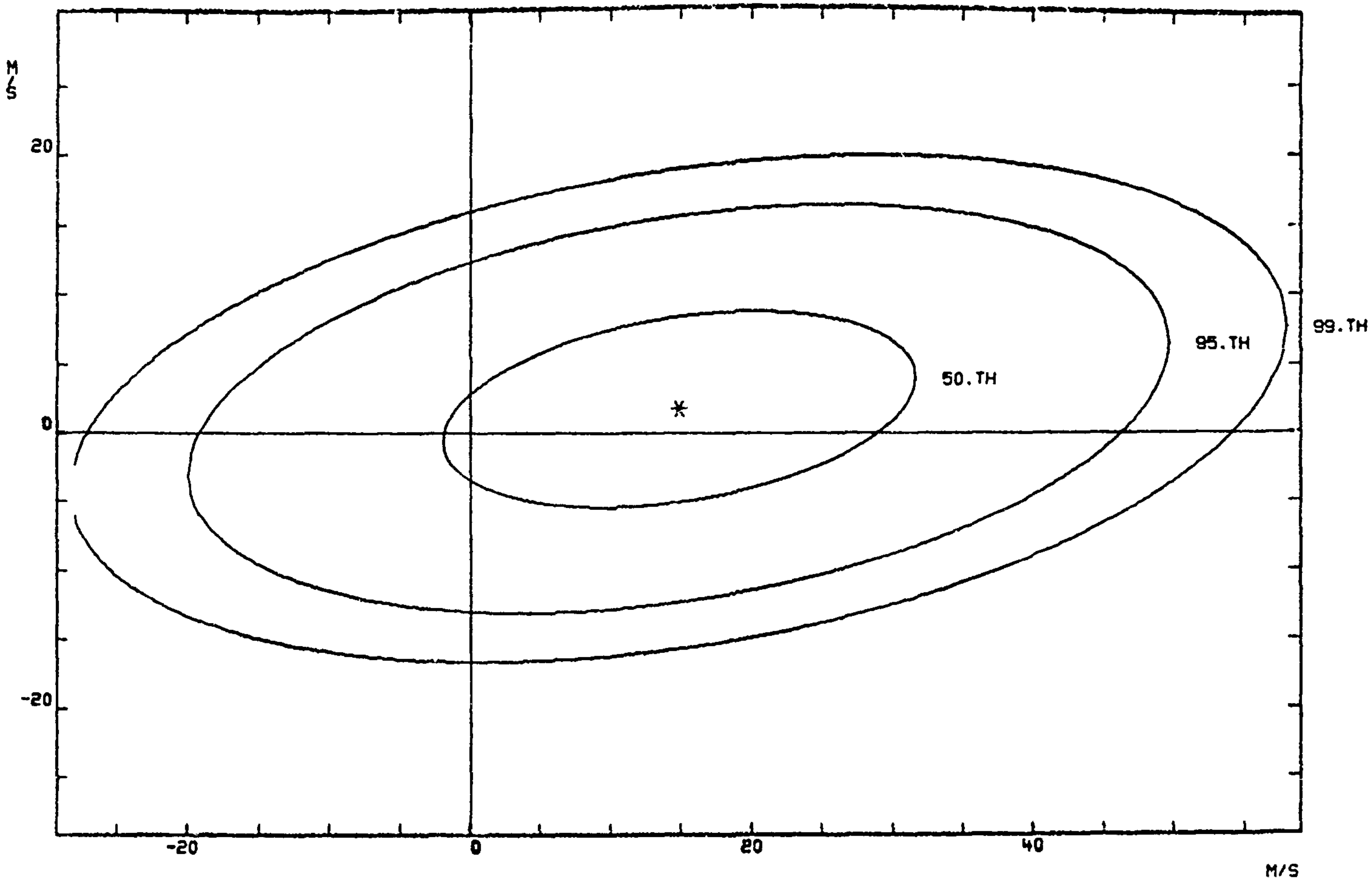


Fig. A-45

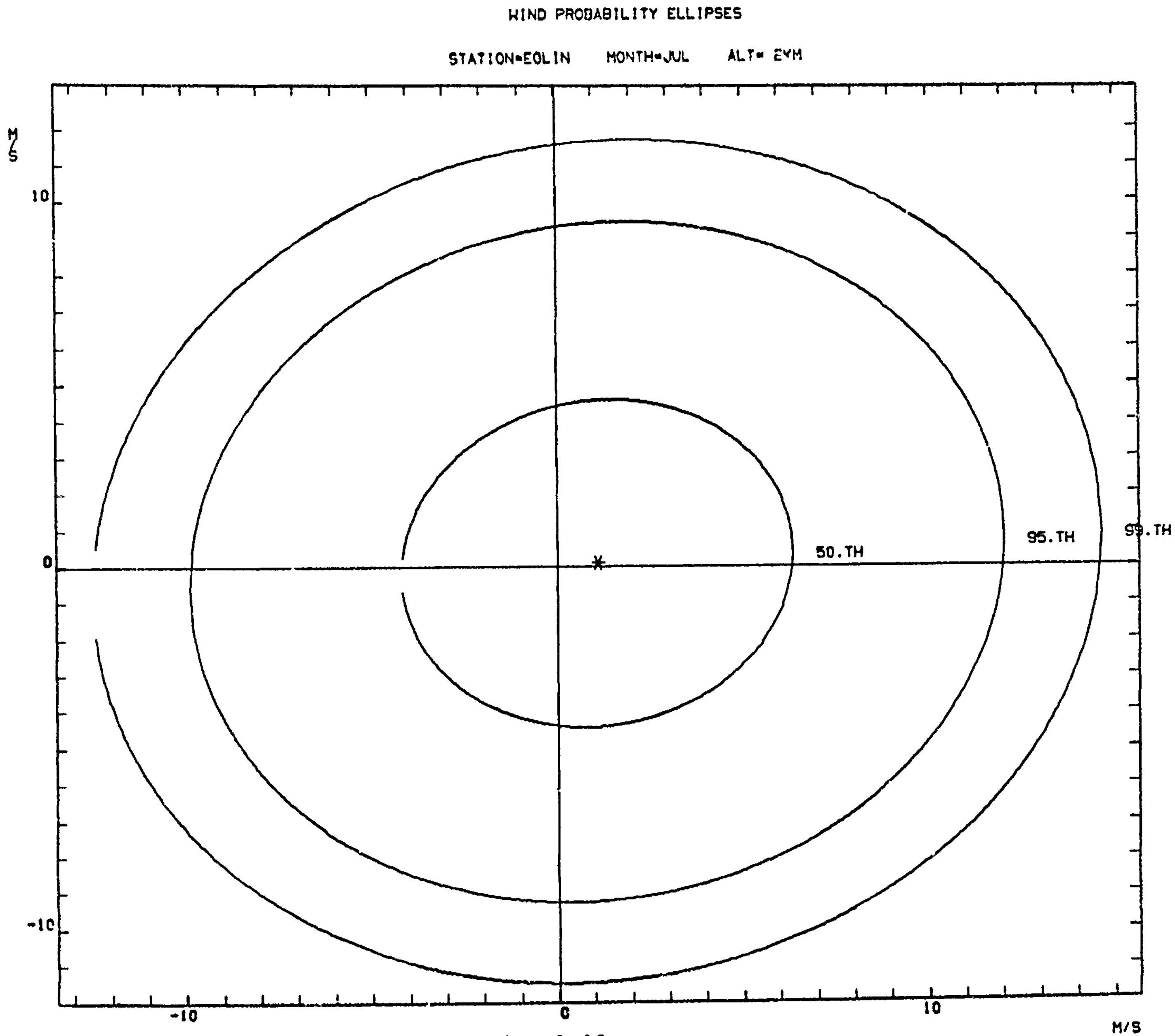
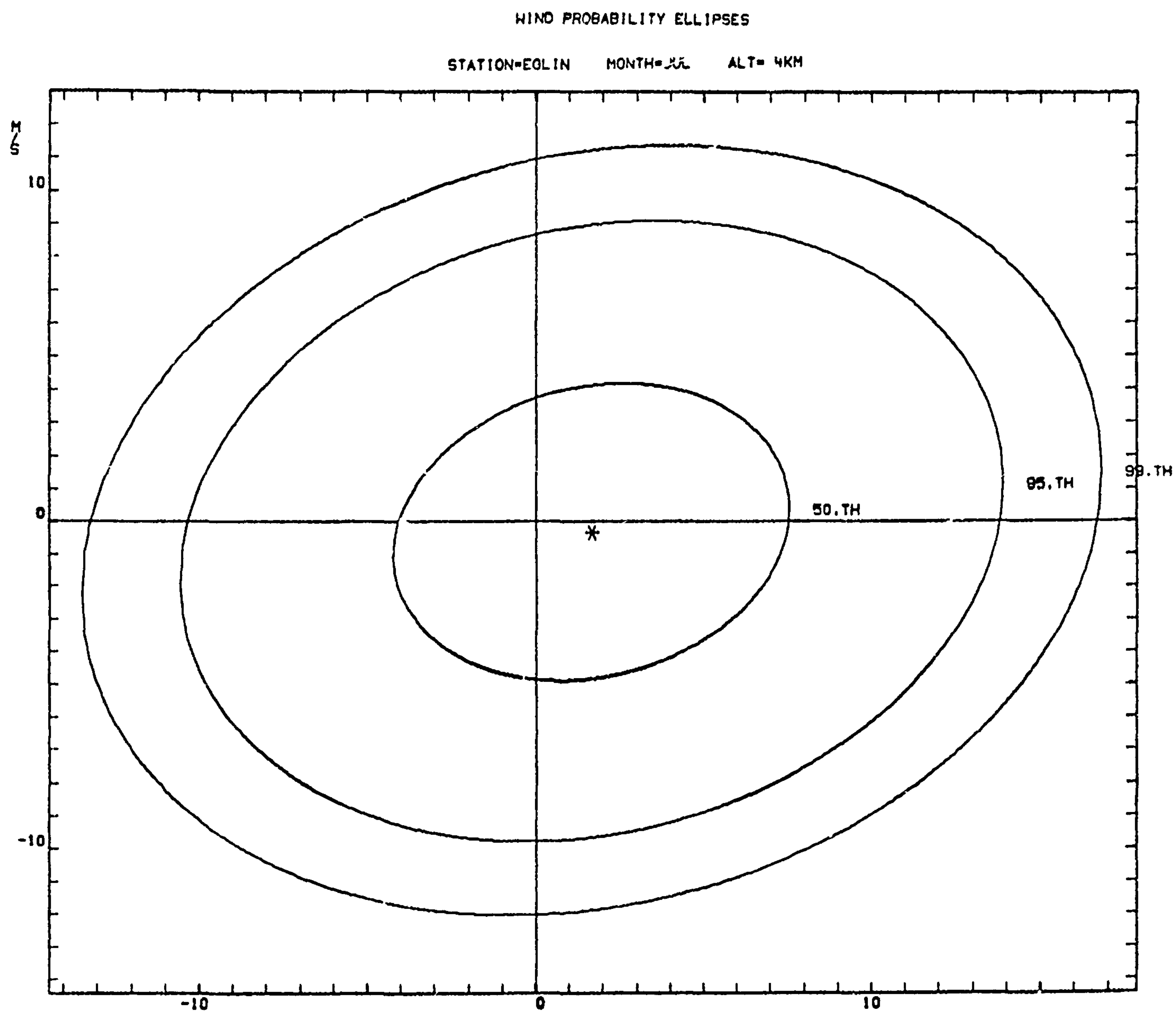
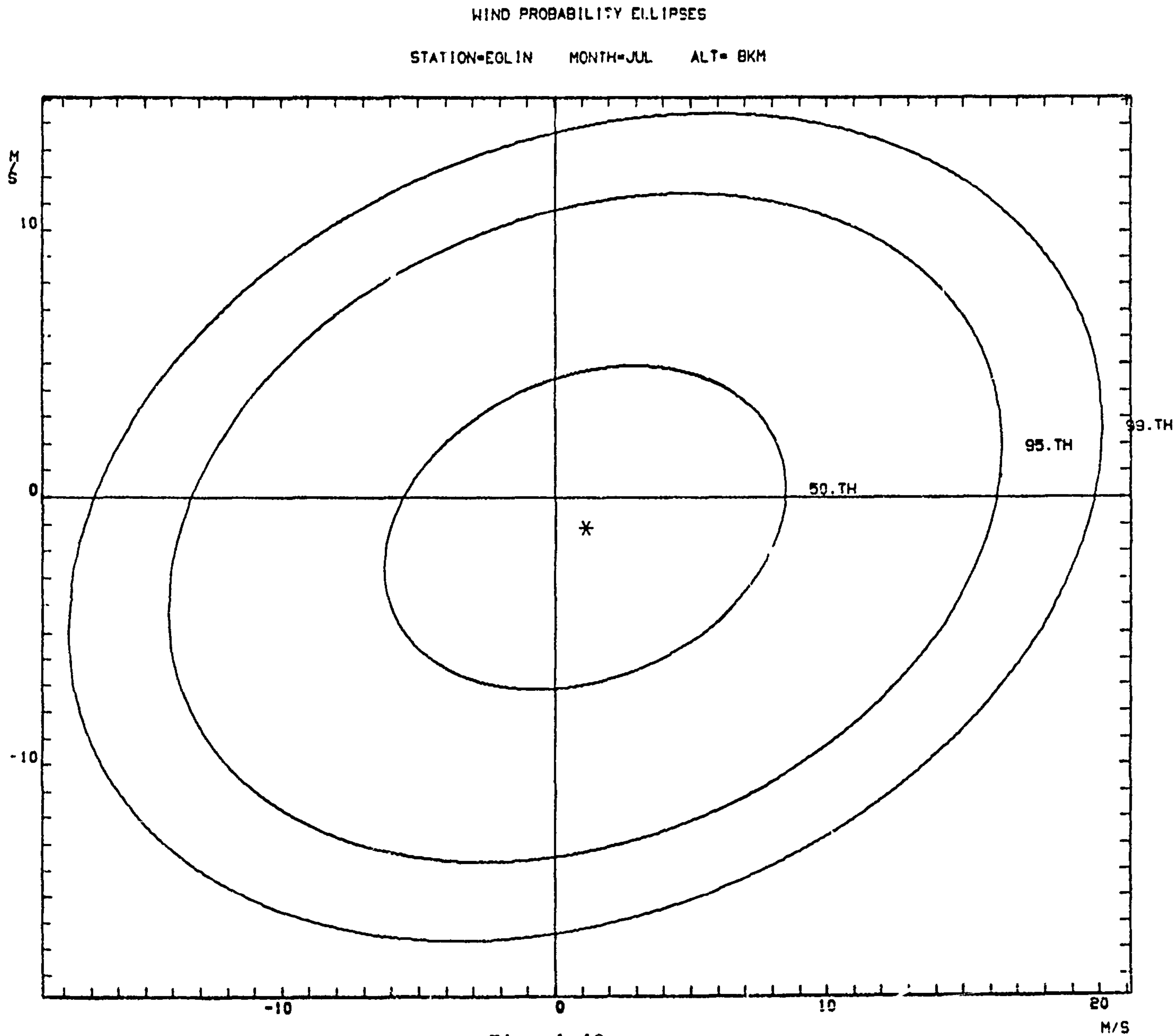

WIND PROBABILITY ELLIPSES
STATION=EOLIN MONTH=JUL ALT= 2KM
M/S
10
0
-10
-10
0
10
M/S
50.TH
95.TH
99.TH

Fig. A-46


WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JUL ALT= 4KM
M/S
10
0
-10
-10
0
10
M/S
50.TH
95.TH
99.TH
Fig. A-47



WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JUL ALT= 8KM
M/S
10
0
-10
-10
0
10
20
M/S
99.TH
95.TH
50.TH

Fig. A-48

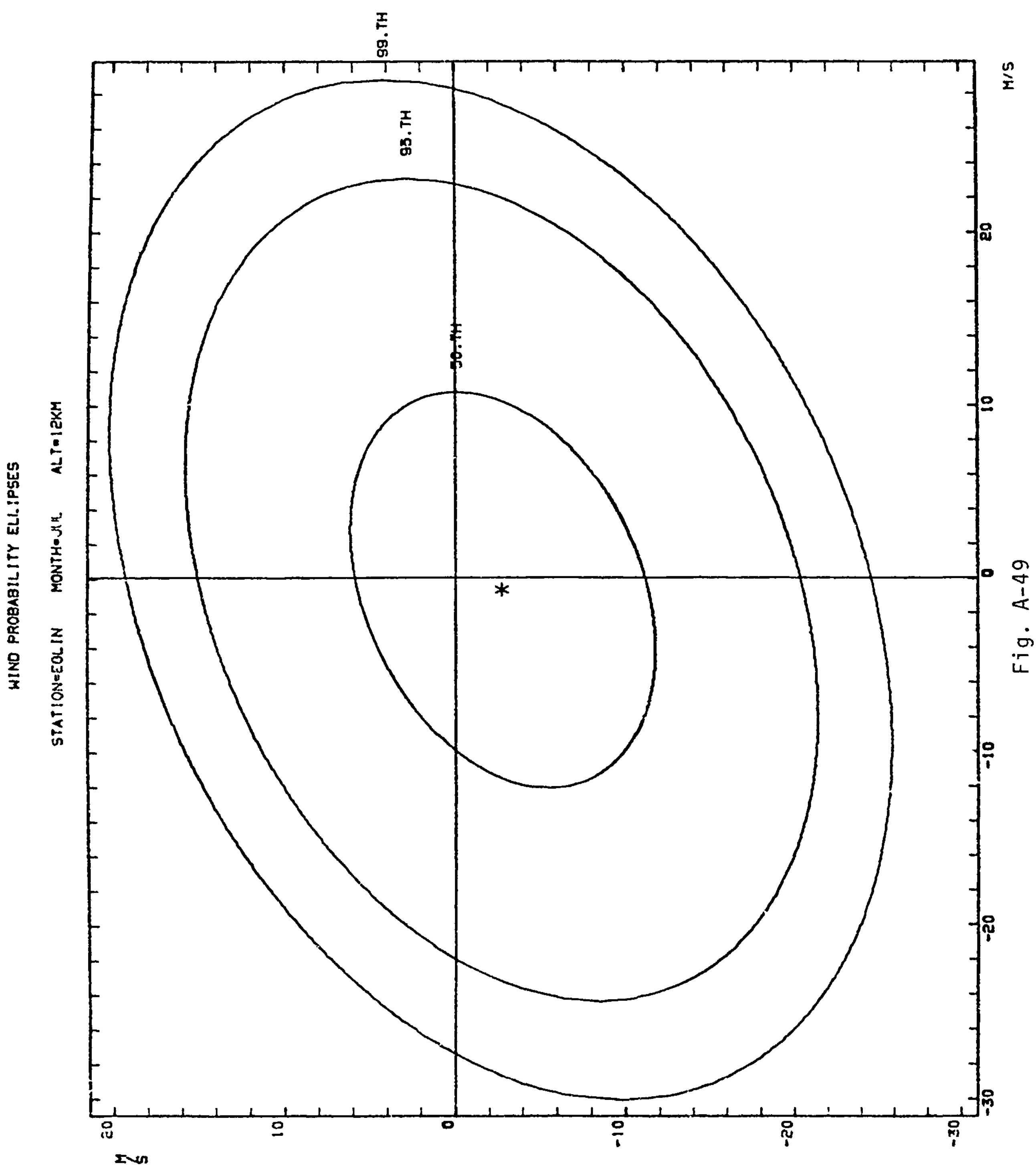

WIND PROBABILITY ELLIPSES
STATION=EOLIN MONTH=JUL ALT=12KM
99.TH
95.TH
50.TH
M/S
M/S
-30
-20
-10
0
10
20

Fig. A-49

WIND PROBABILITY ELLIPSES

STATION=EGLIN MONTH=JUL ALT=16KM

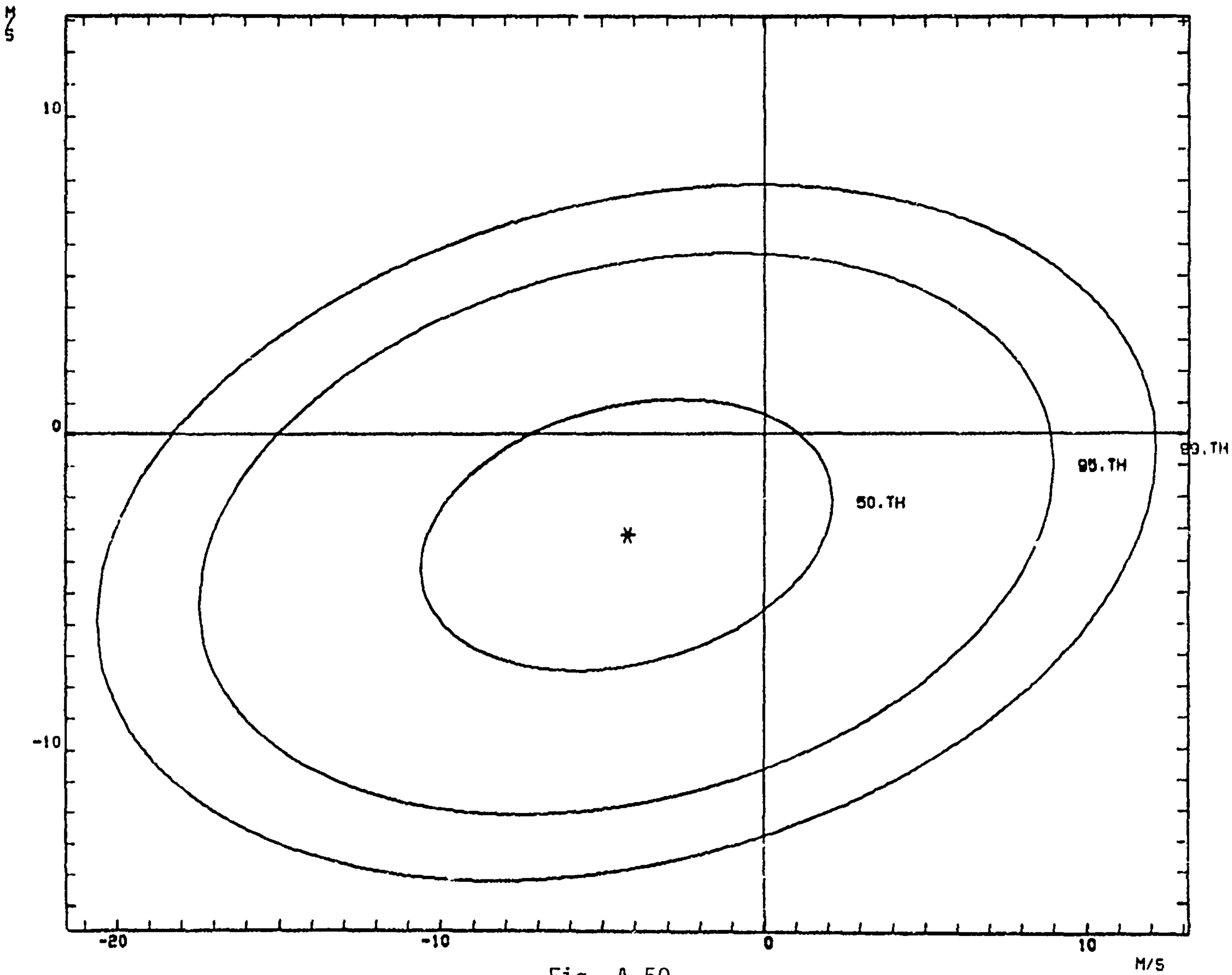


Fig. A-50

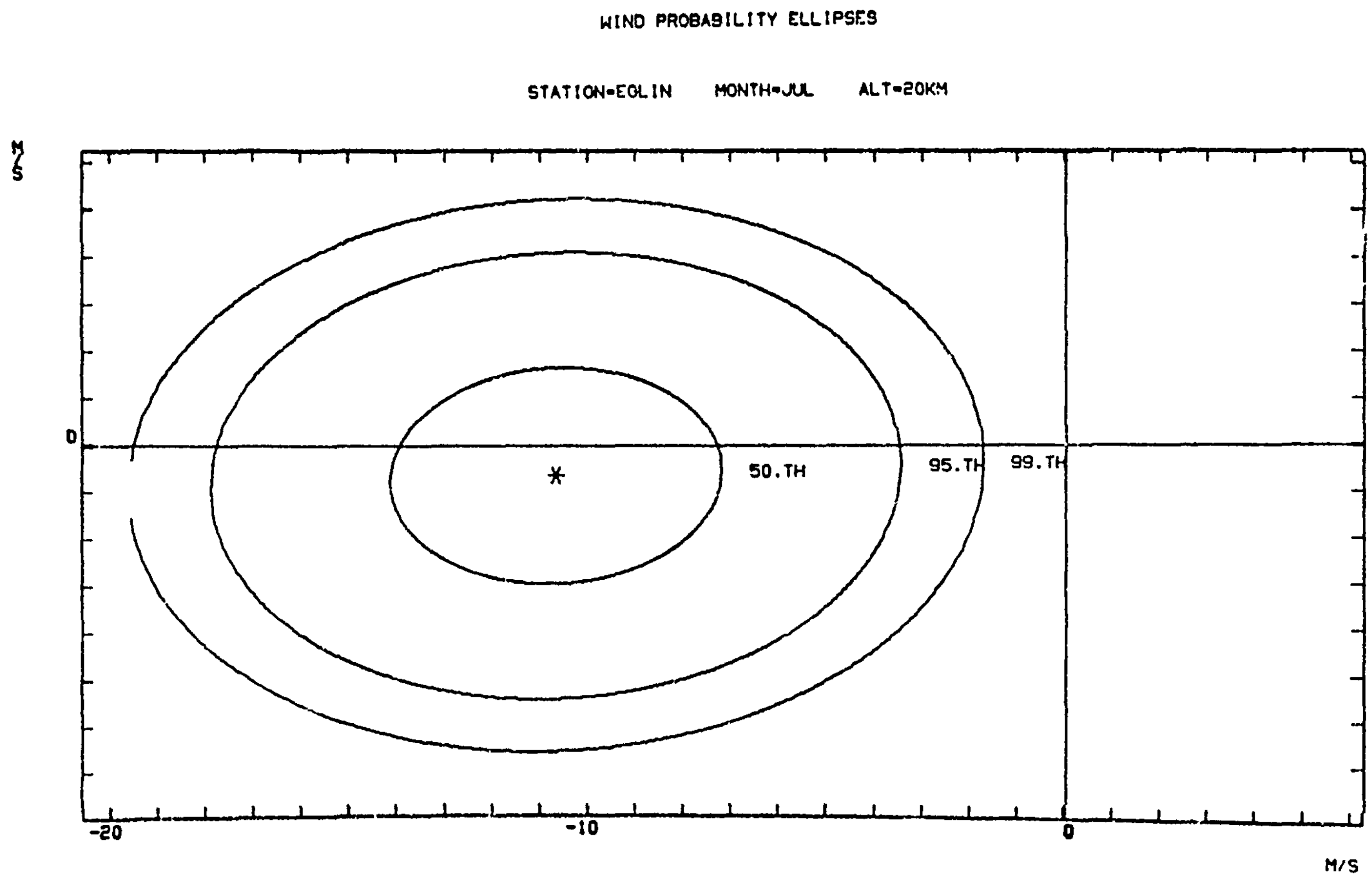

WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JUL ALT=20KM
M/S
0
50.TH
95.TH
99.TH
-20
-10
0
M/S

Fig A-51

WIND PROBABILITY ELLIPSES

STATION=EGLIN MONTH=JUL ALT=24KM

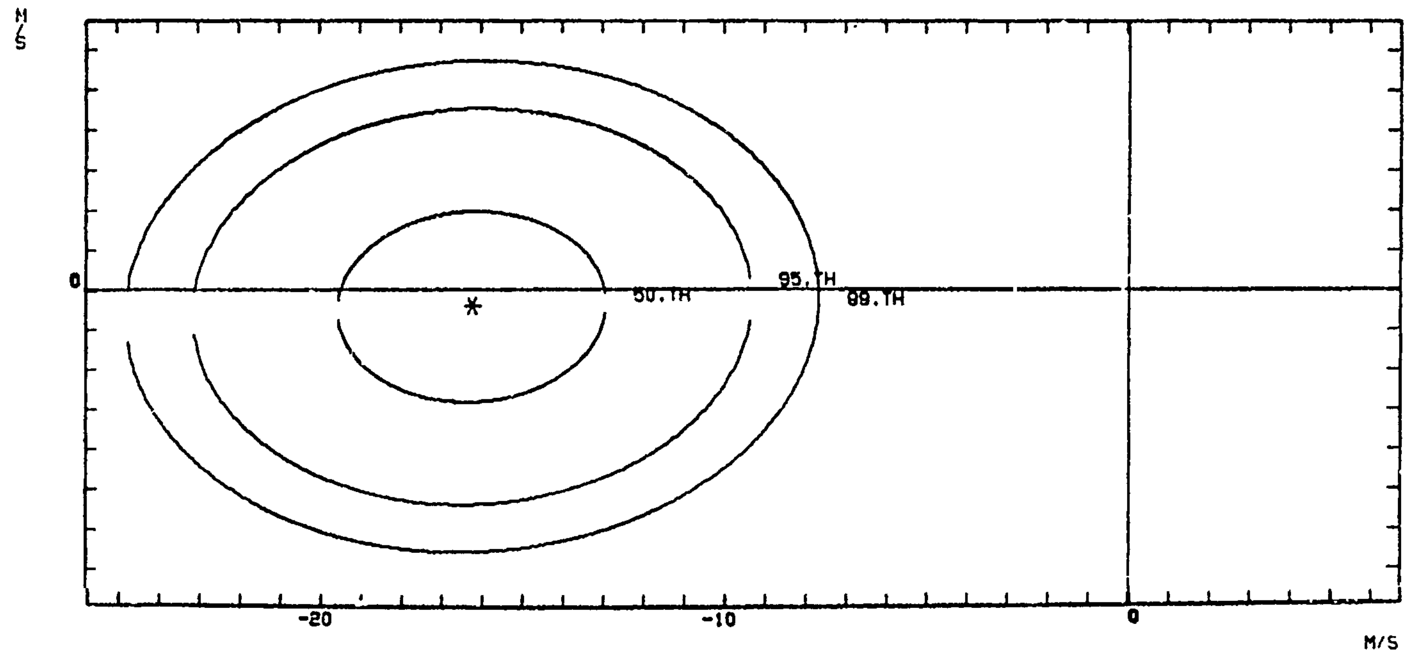


Fig. A-52

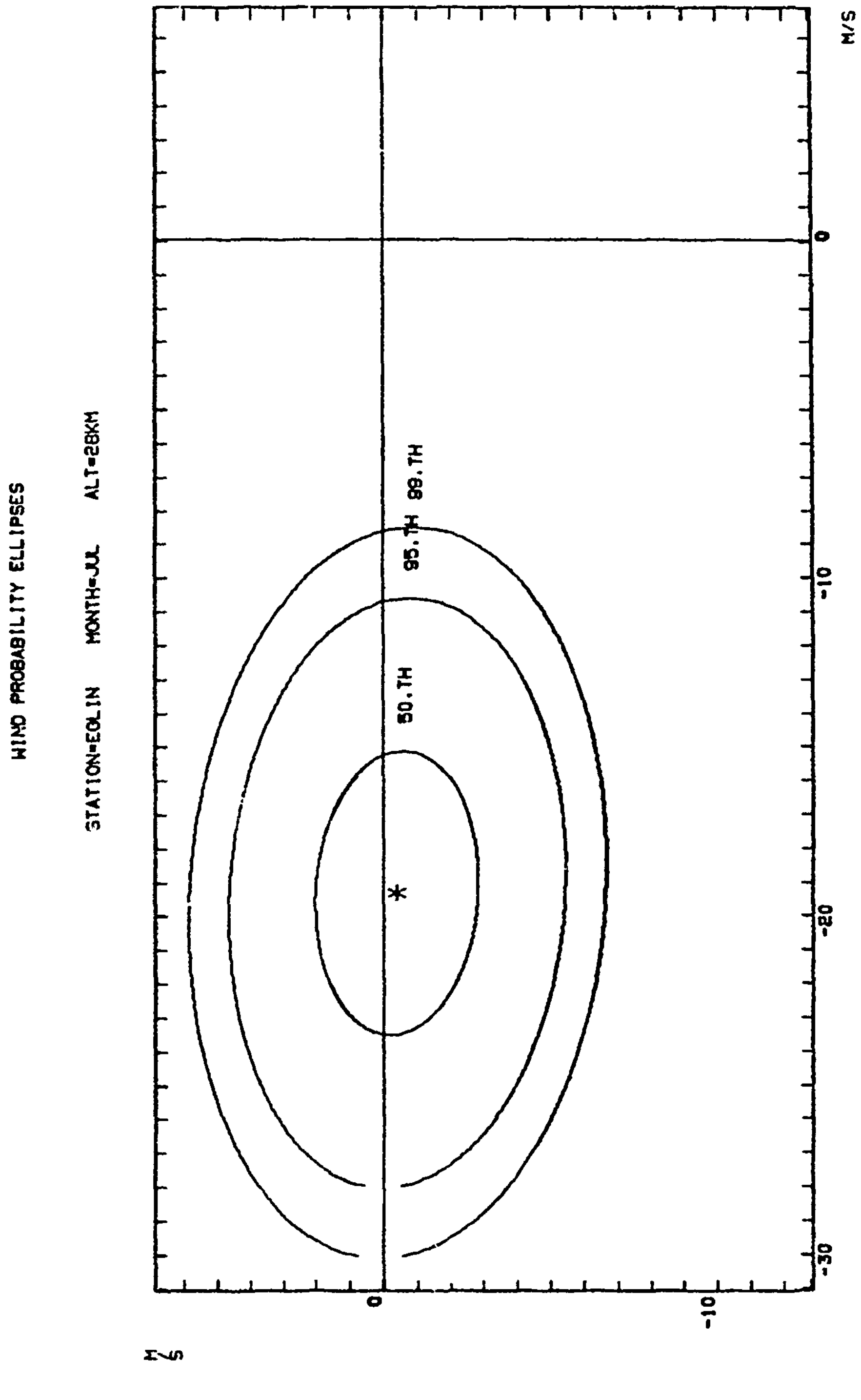

WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JUL ALT=28KM
50.TH
95.TH
99.TH
0
-10
-20
-30
M/S
0
-10
M/S

Fig. A-53

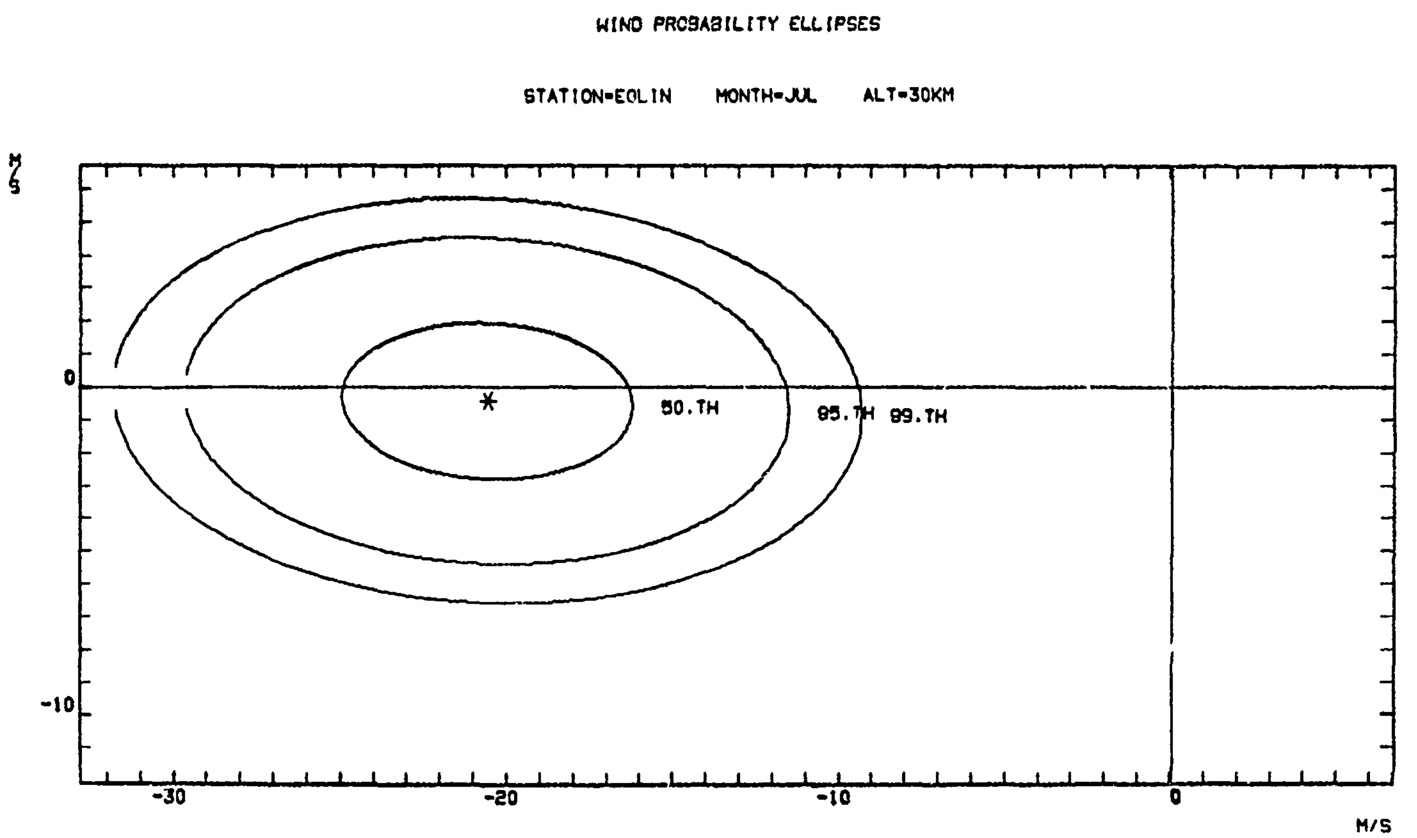
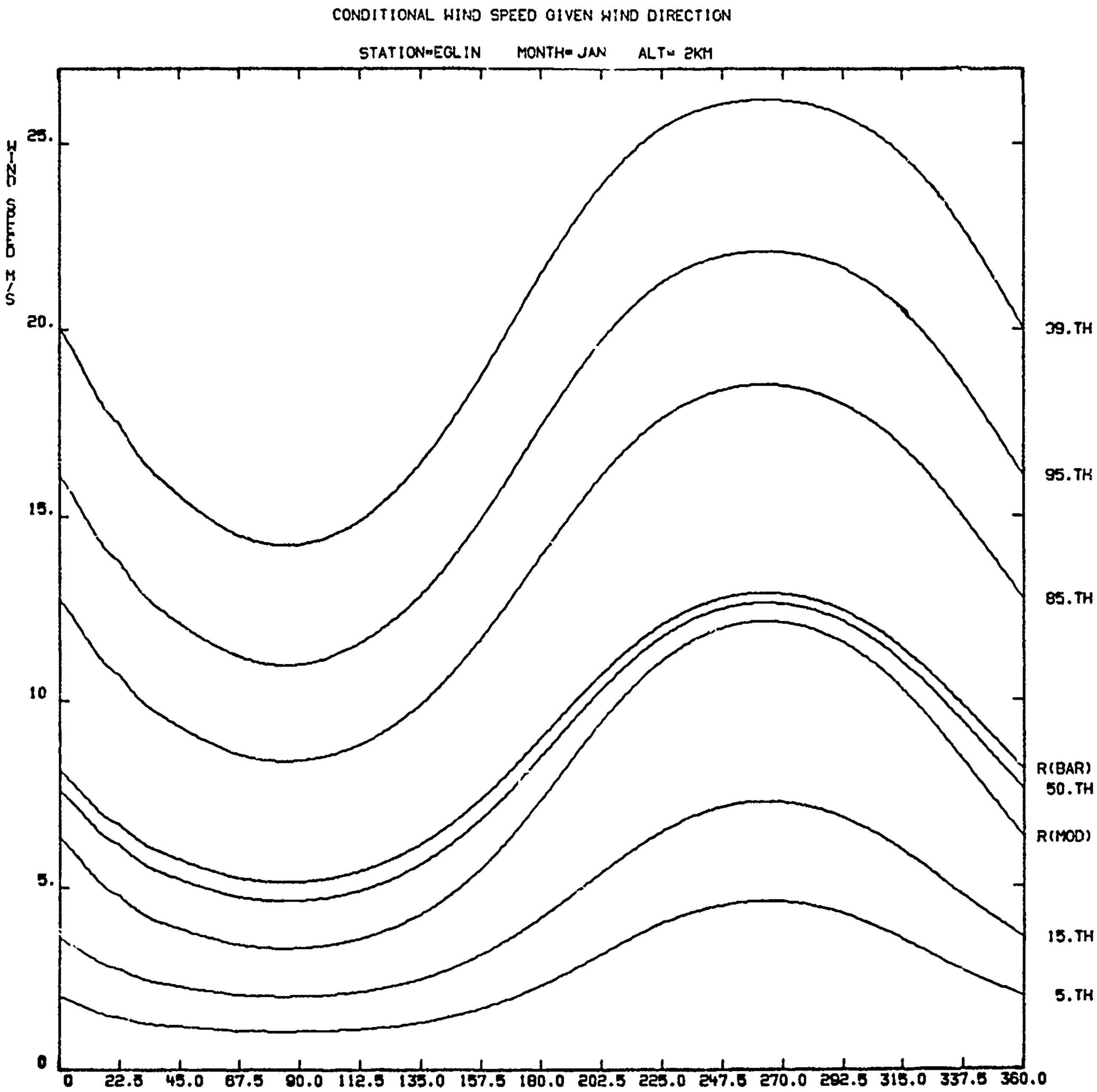

WIND PROBABILITY ELLIPSES
STATION=EGLIN MONTH=JUL ALT=30KM
M/S
0
-10
50.TH
95.TH 99.TH
-30
-20
-10
0
M/S

Fig. A-54



CONDITIONAL WIND SPEED GIVEN WIND DIRECTION
STATION=EGLIN MONTH= JAN ALT= 2KM
WIND SPEED M/S
25.
20.
15.
10
5.
0
0 22.5 45.0 67.5 90.0 112.5 135.0 157.5 180.0 202.5 225.0 247.5 270.0 292.5 315.0 337.5 360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH

Fig. A-55

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

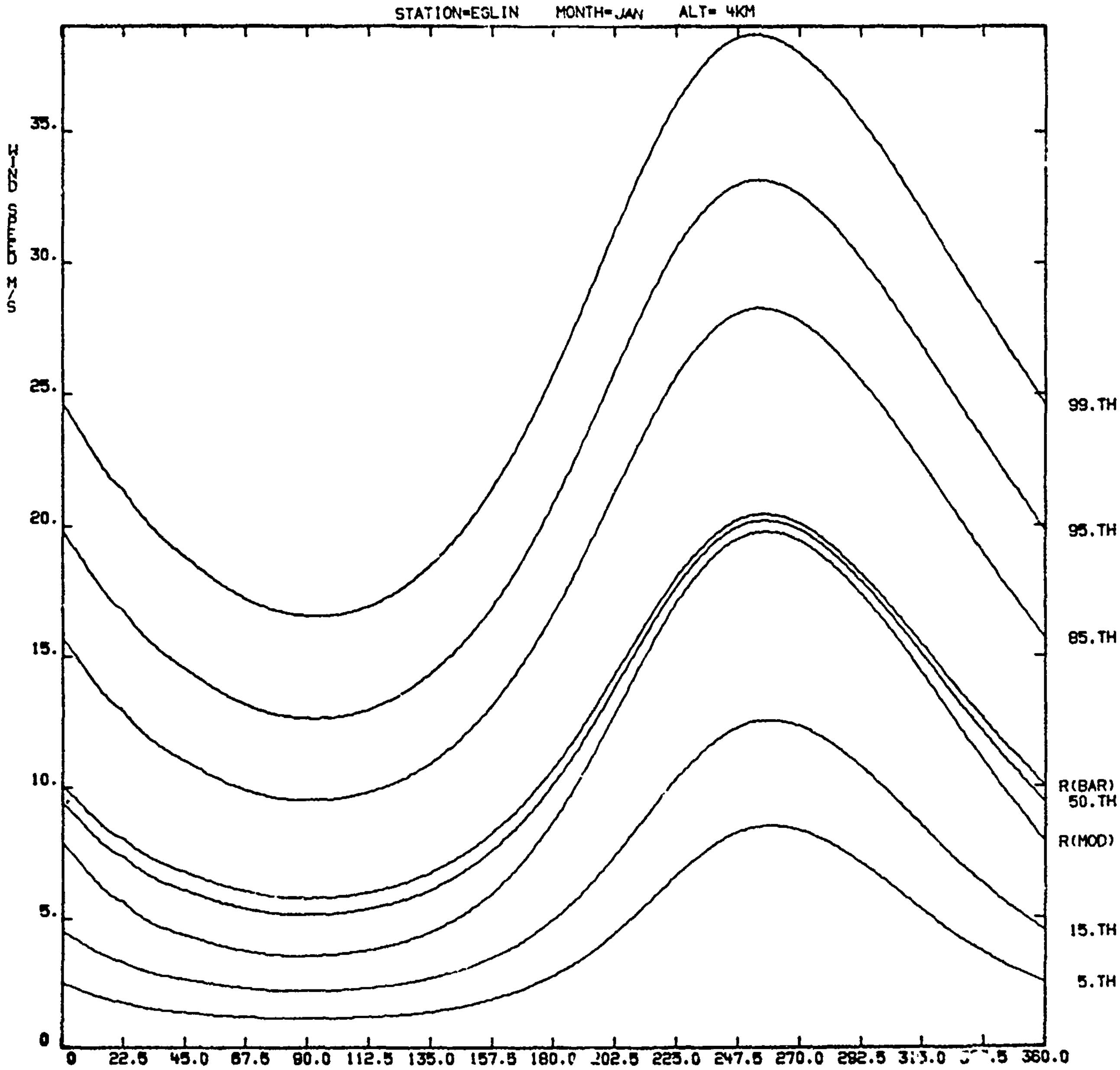


Fig. A-56

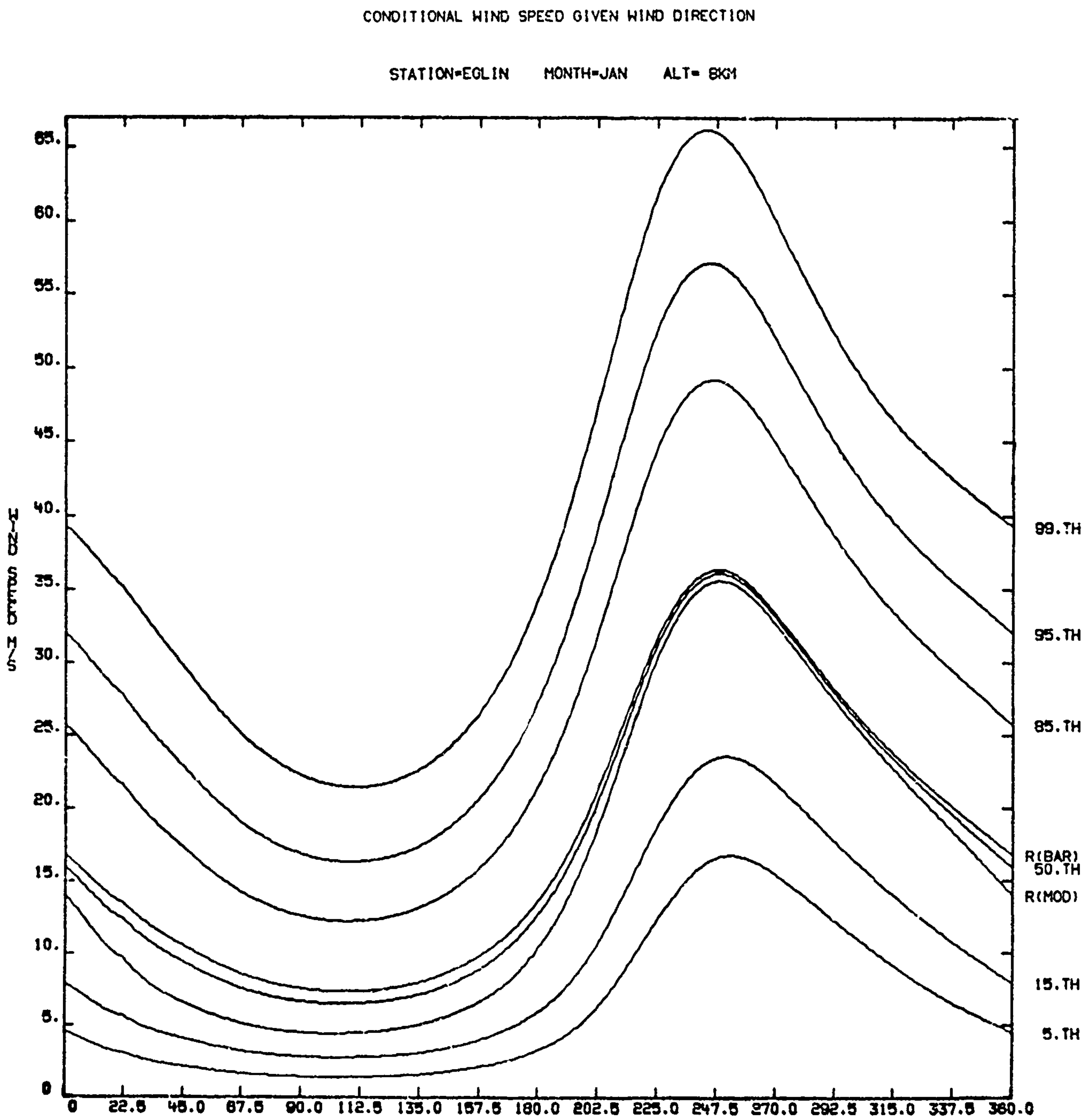

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION
STATION=EGLIN MONTH=JAN ALT= 8KM
WIND SPEED M/S
65.
60.
55.
50.
45.
40.
35.
30.
25.
20.
15.
10.
5.
0
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH

Fig. A-57

CONDITIONAL '.ND SPEED GIVEN WIND DIRECTION

STATION=EGLIN   MONTH=JAN   ALT=12KM

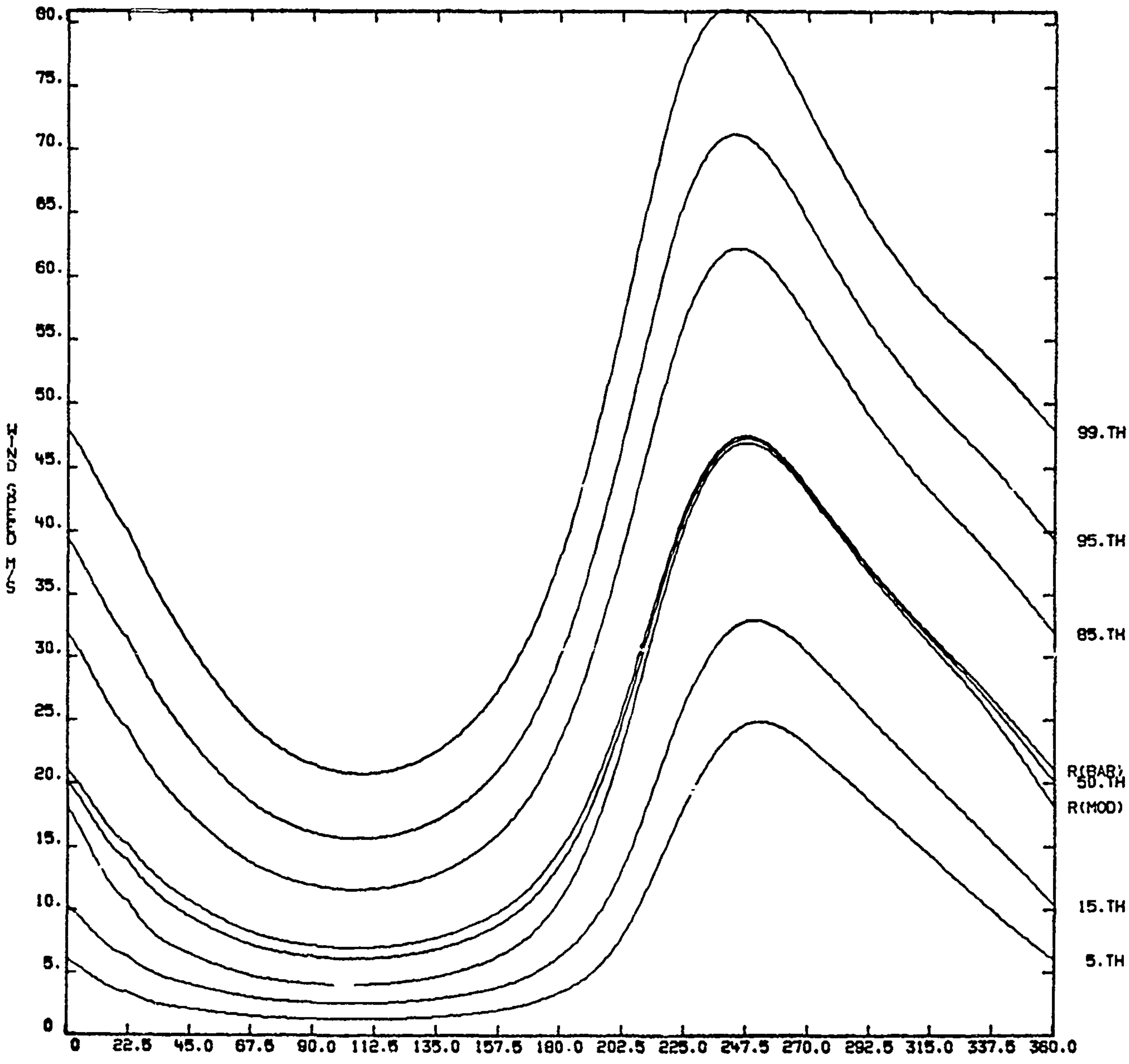
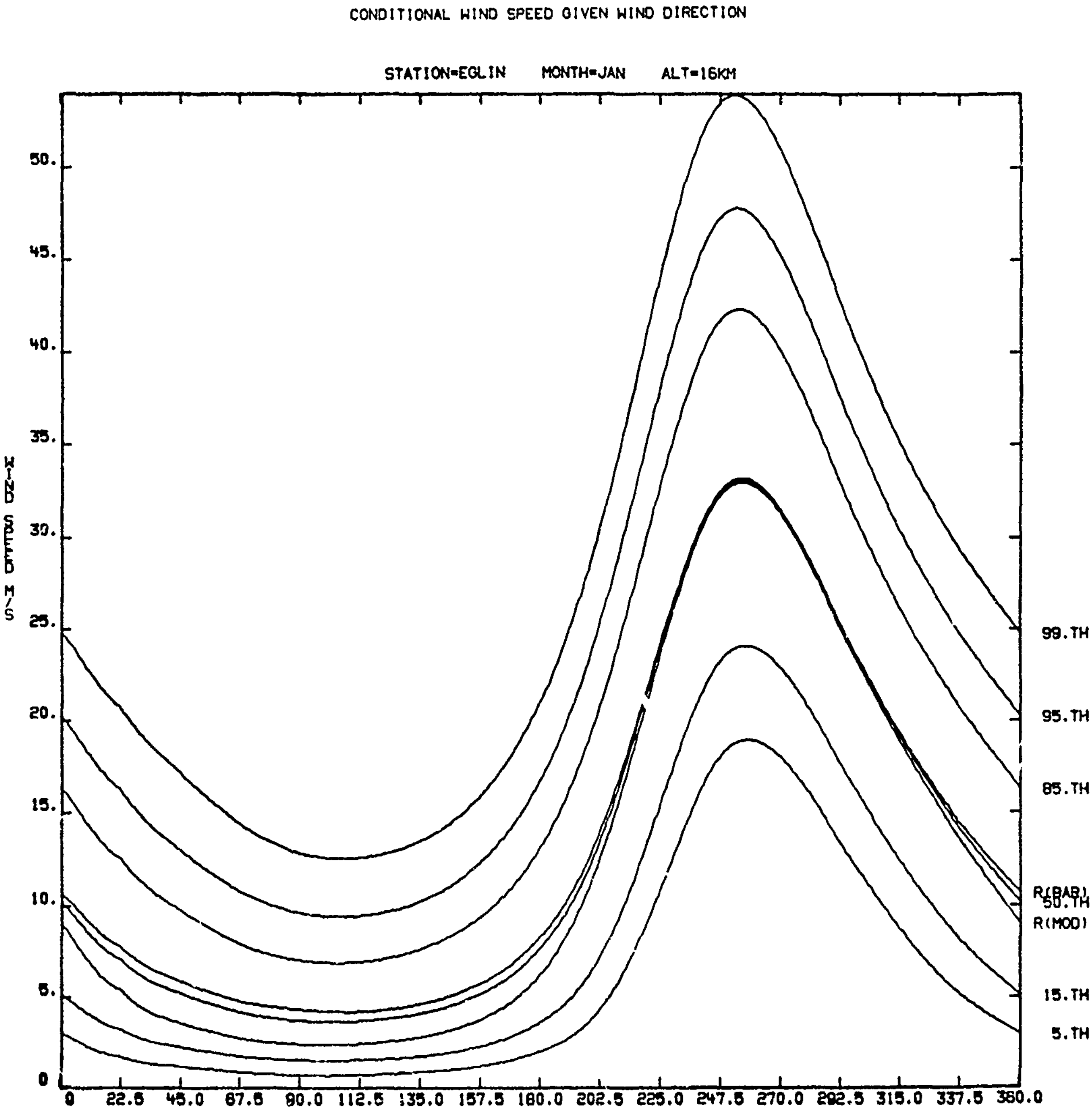
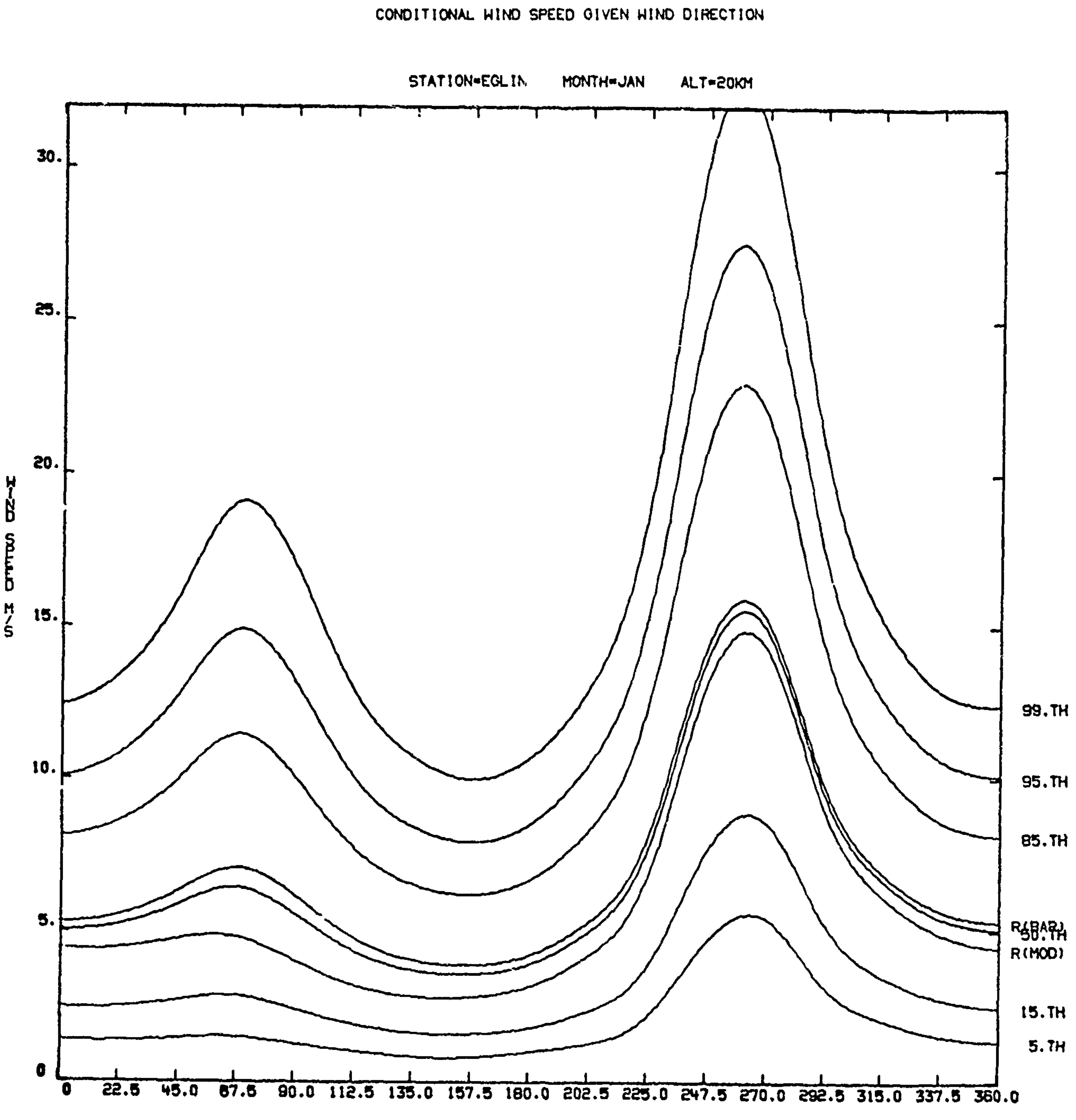


Fig. A-58



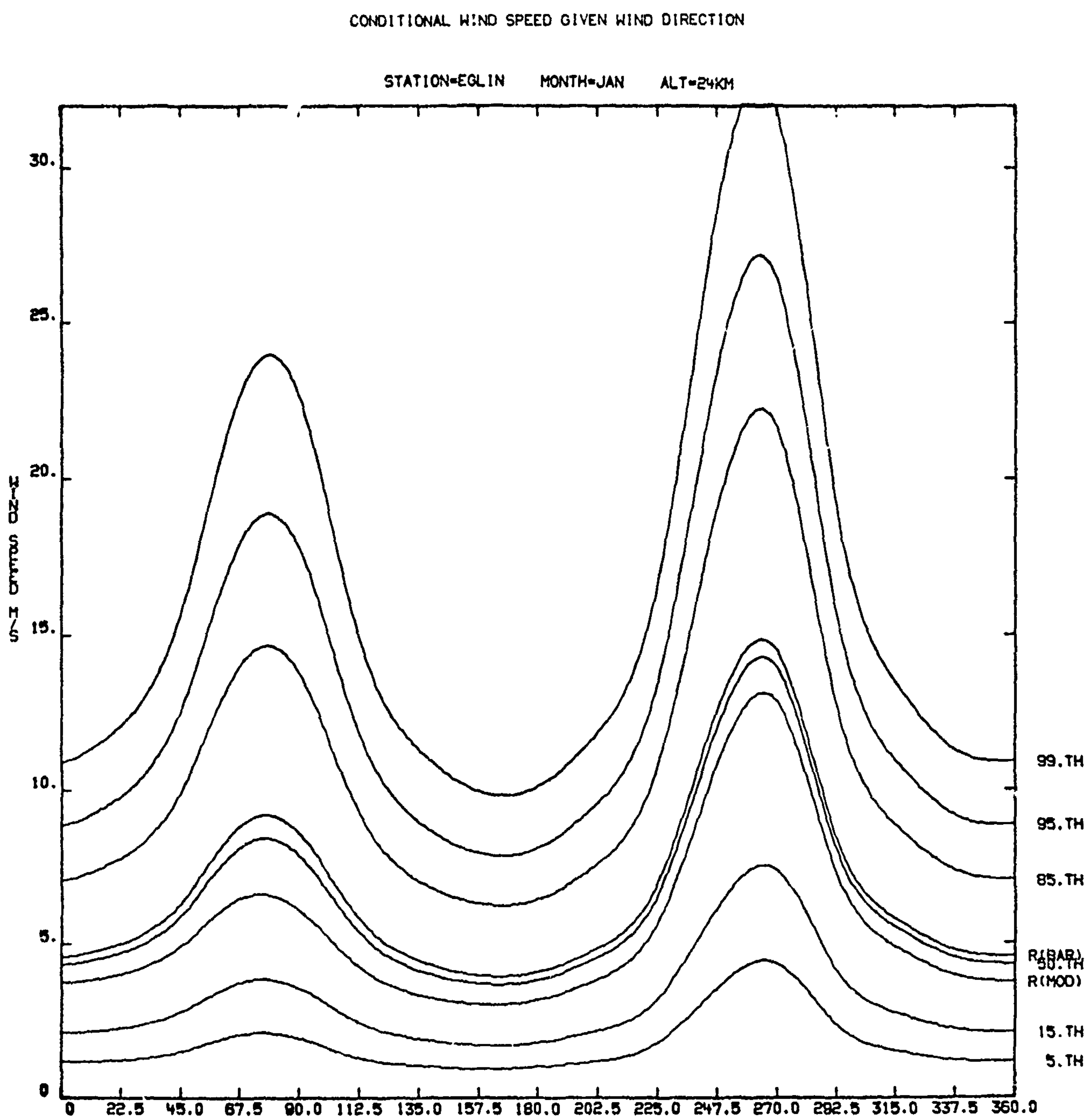
CONDITIONAL WIND SPEED GIVEN WIND DIRECTION
STATION=EGLIN MONTH=JAN ALT=16KM
WIND SPEED M/S
0
5.
10.
15.
20.
25.
30.
35.
40.
45.
50.
0 22.5 45.0 67.5 90.0 112.5 135.0 157.5 180.0 202.5 225.0 247.5 270.0 292.5 315.0 337.5 360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH

Fig. A-59



CONDITIONAL WIND SPEED GIVEN WIND DIRECTION
STATION=EGLIN MONTH=JAN ALT=20KM
WIND SPEED M/S
30.
25.
20.
15.
10.
5.
0
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH

Fig. A-60



CONDITIONAL WIND SPEED GIVEN WIND DIRECTION
STATION=EGLIN MONTH=JAN ALT=24KM
WIND SPEED M/S
30.
25.
20.
15.
10.
5.
0
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH

Fig. A-61

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

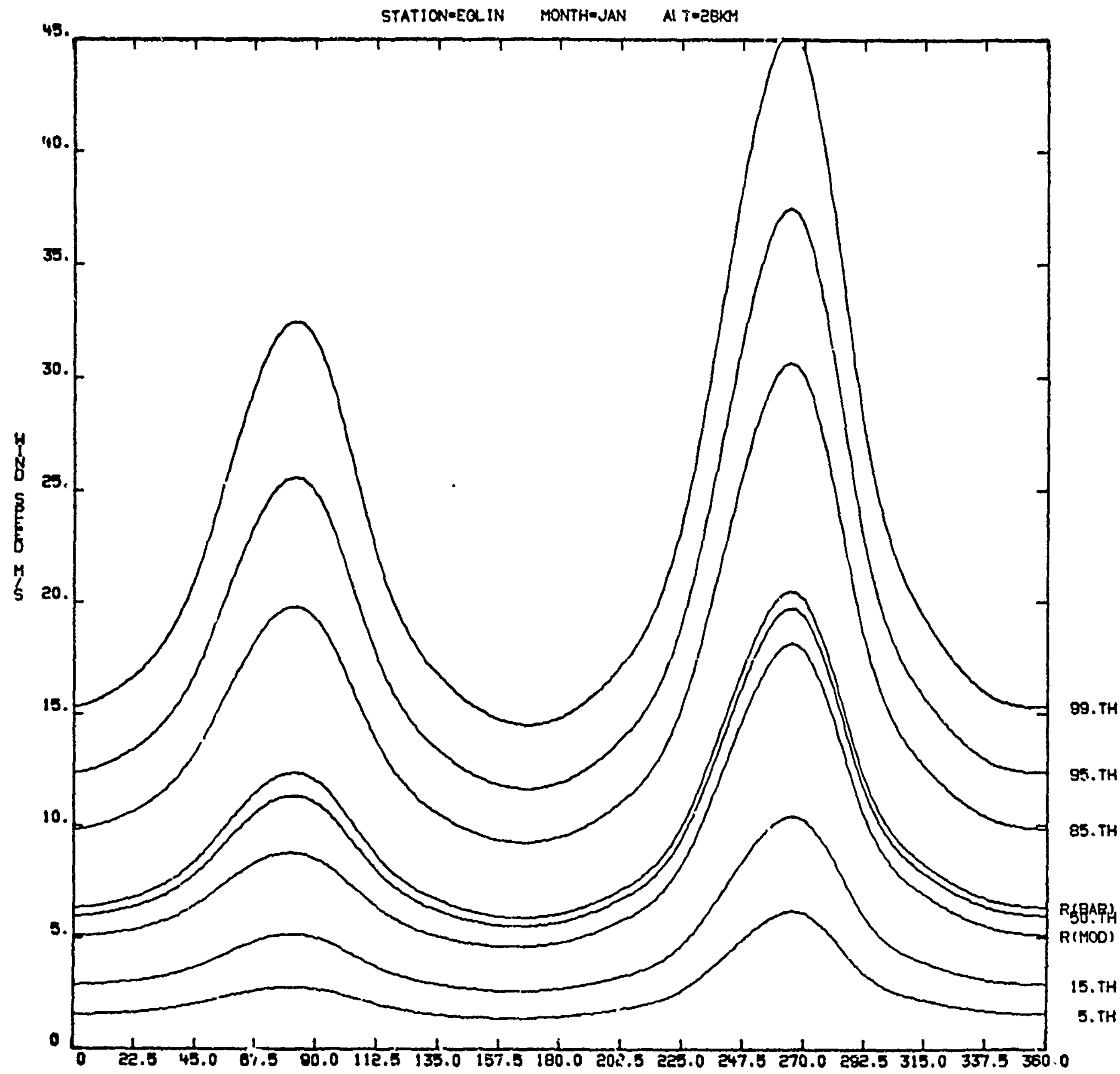


Fig. A-62

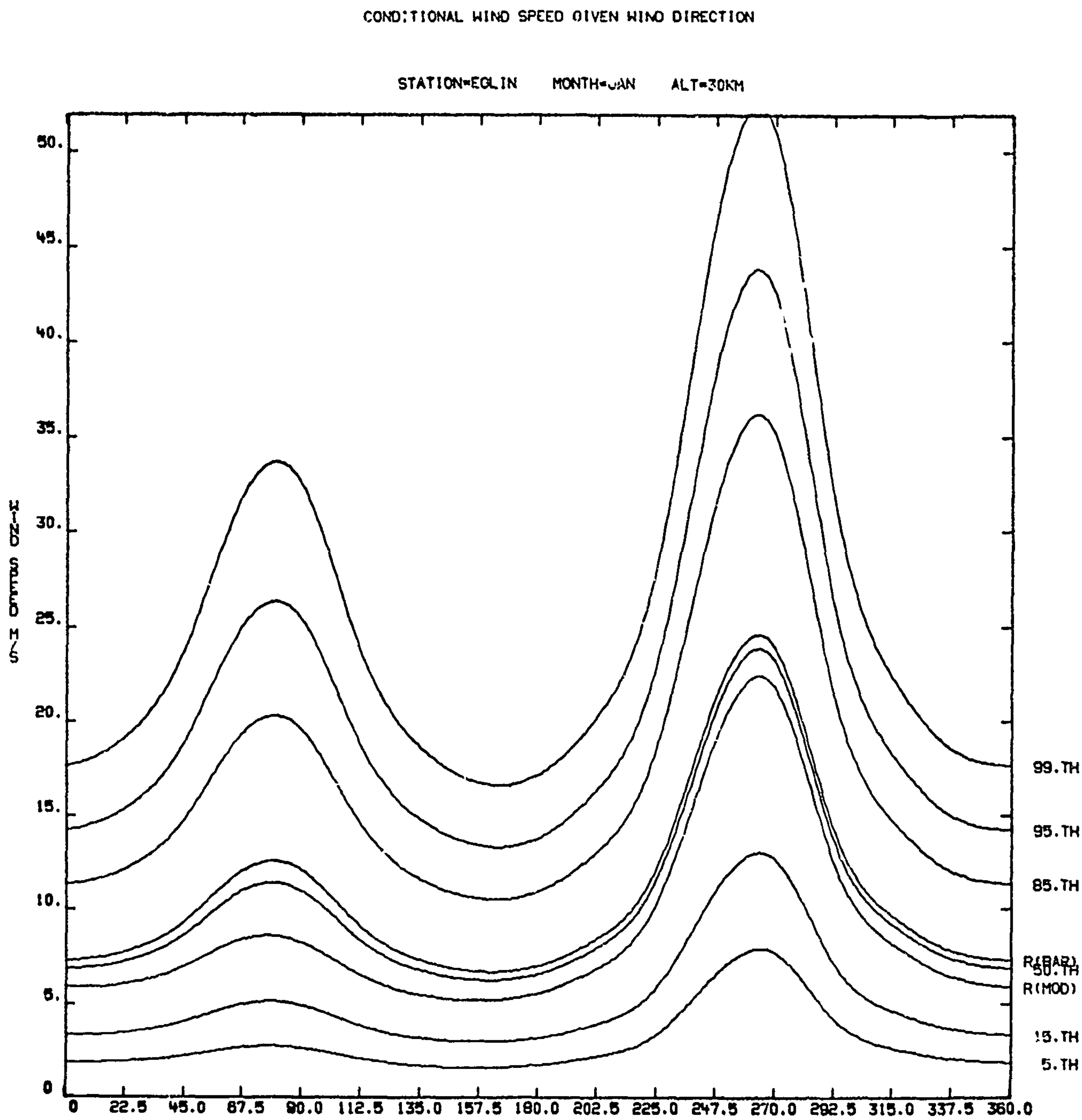

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION
STATION=EGLIN MONTH=JAN ALT=30KM
WIND SPEED M/S
50.
45.
40.
35.
30.
25.
20.
15.
10.
5.
0
0 22.5 45.0 67.5 90.0 112.5 135.0 157.5 180.0 202.5 225.0 247.5 270.0 292.5 315.0 337.5 360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH

Fig. A-63

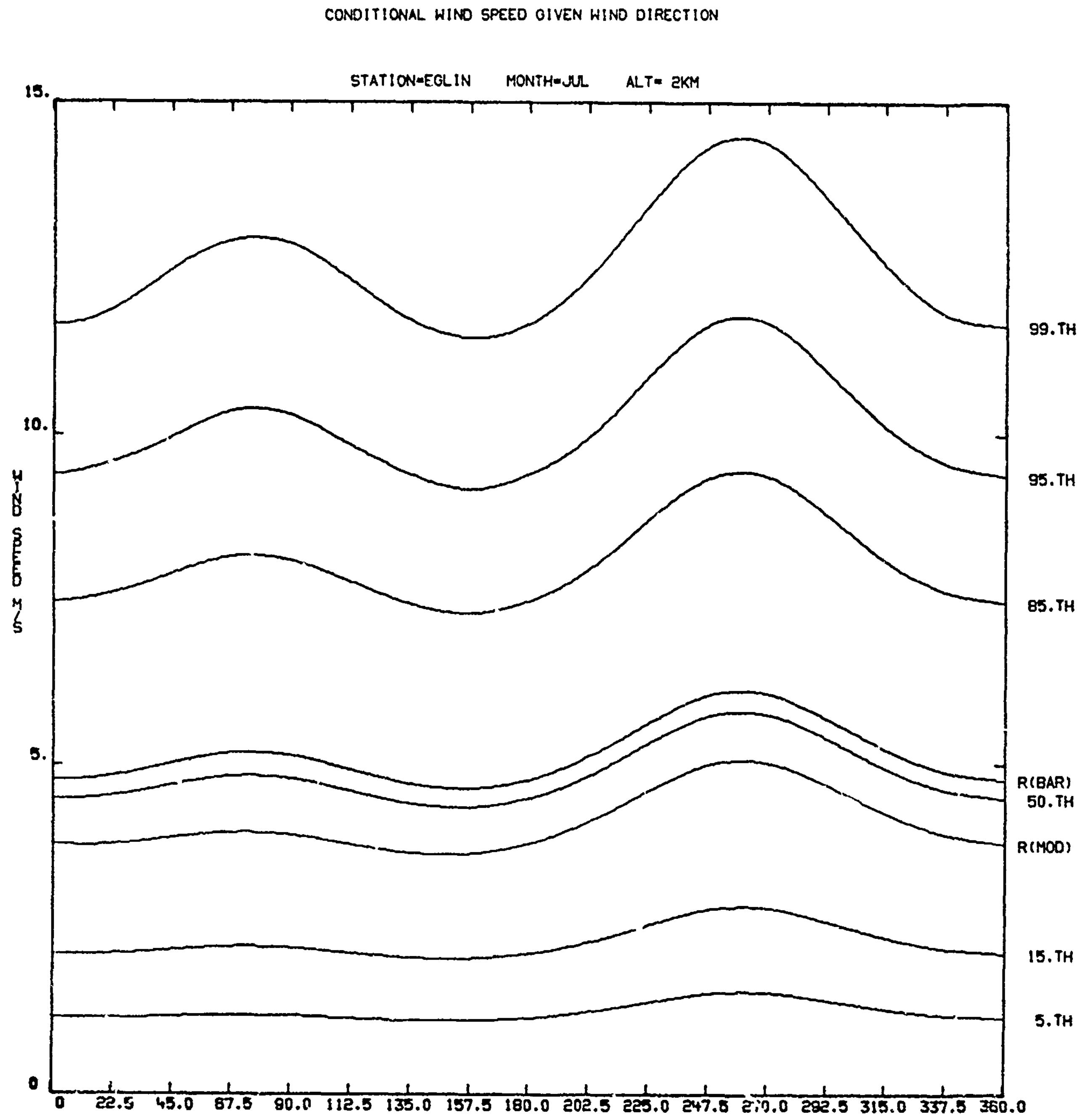

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION
STATION=EGLIN MONTH=JUL ALT= 2KM
15.
10.
5.
0
WIND SPEED M/S
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH
0
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
202.5
225.0
247.5
270.0
292.5
315.0
337.5
360.0

Fig. A-64

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

STATION=EGLIN MONTH=JUL ALT= 4KM

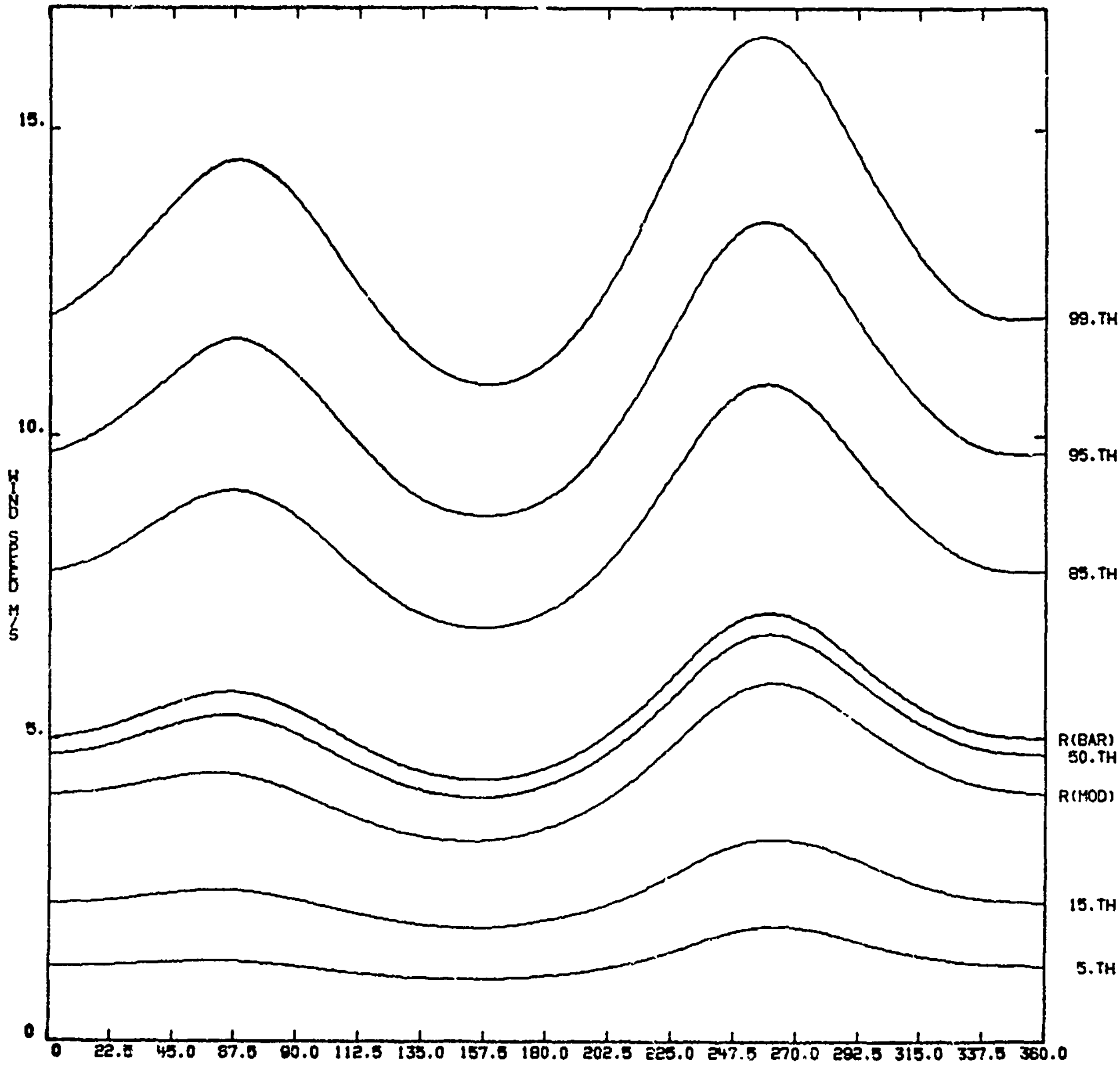


Fig. A-65

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

STATION=EGLIN MONTH=JUL ALT= 8KM

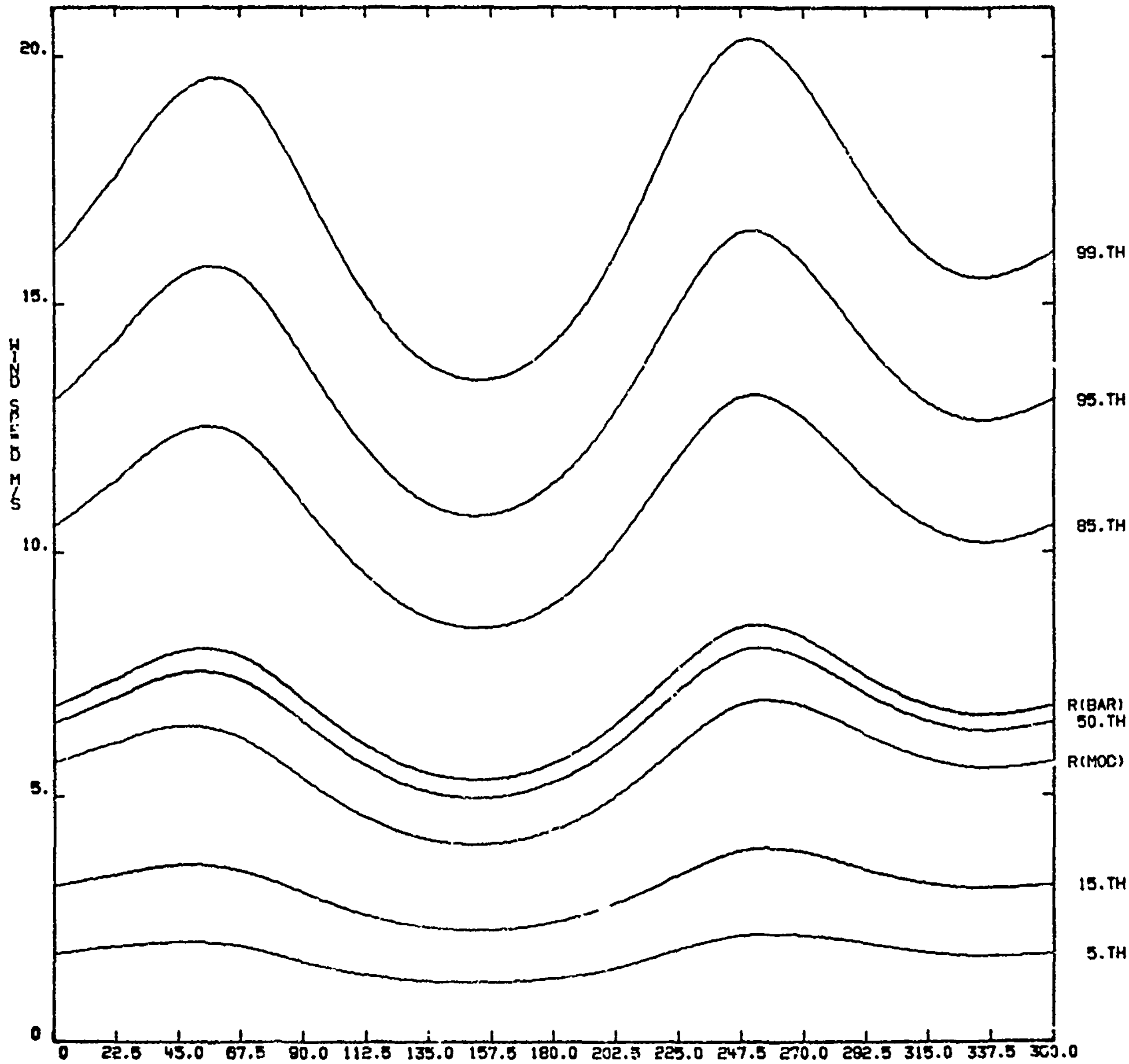


Fig. A-66

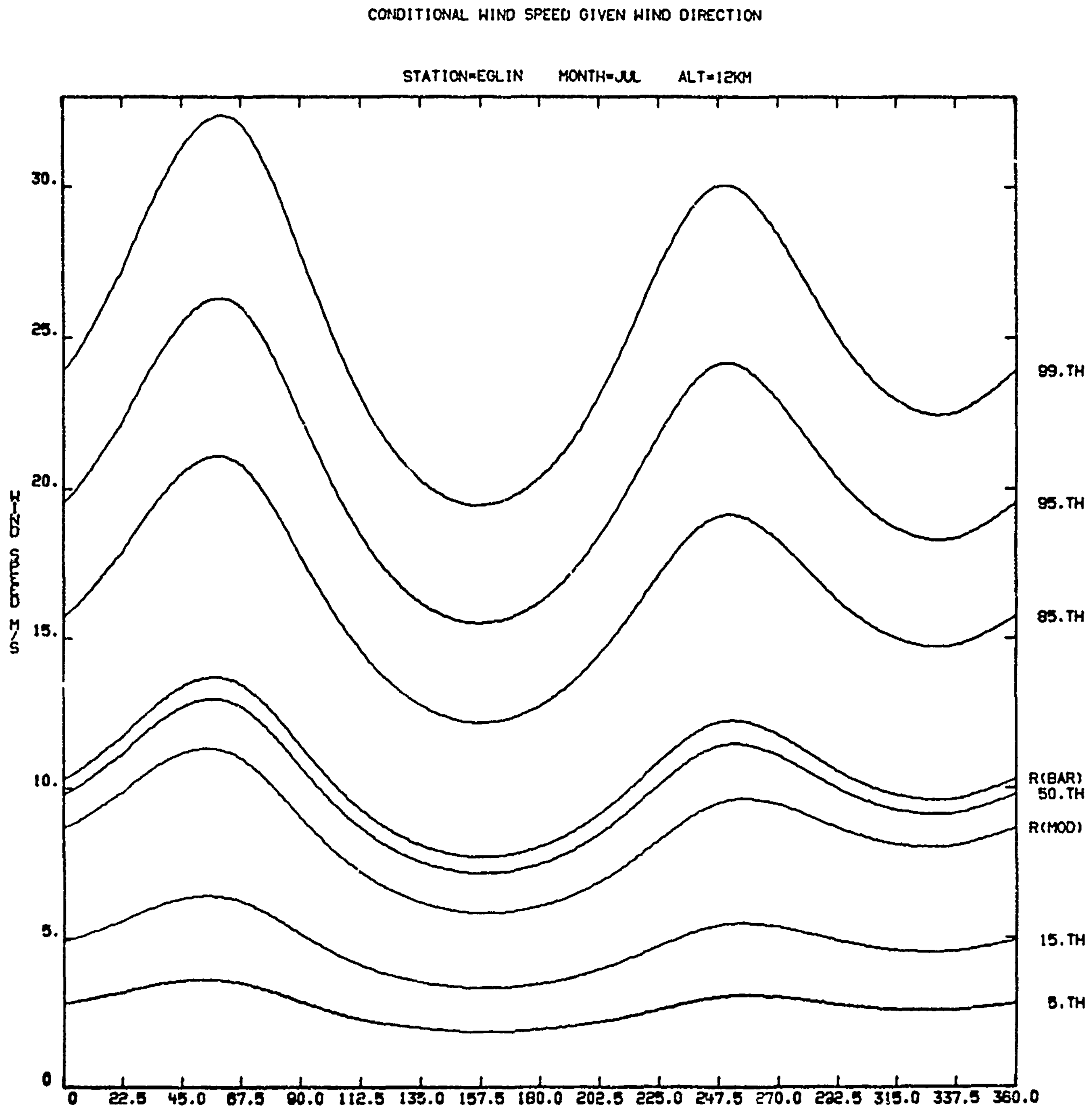

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION
STATION=EGLIN MONTH=JUL ALT=12KM
WIND SPEED M/S
30.
25.
20.
15.
10.
5.
0
0 22.5 45.0 67.5 90.0 112.5 135.0 157.5 180.0 202.5 225.0 247.5 270.0 292.5 315.0 337.5 360.0
99.TH
95.TH
85.TH
R(BAR)
50.TH
R(MOD)
15.TH
5.TH

Fig. A-67

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

STATION=EGLIN   MONTH=JUL   ALT=16KM

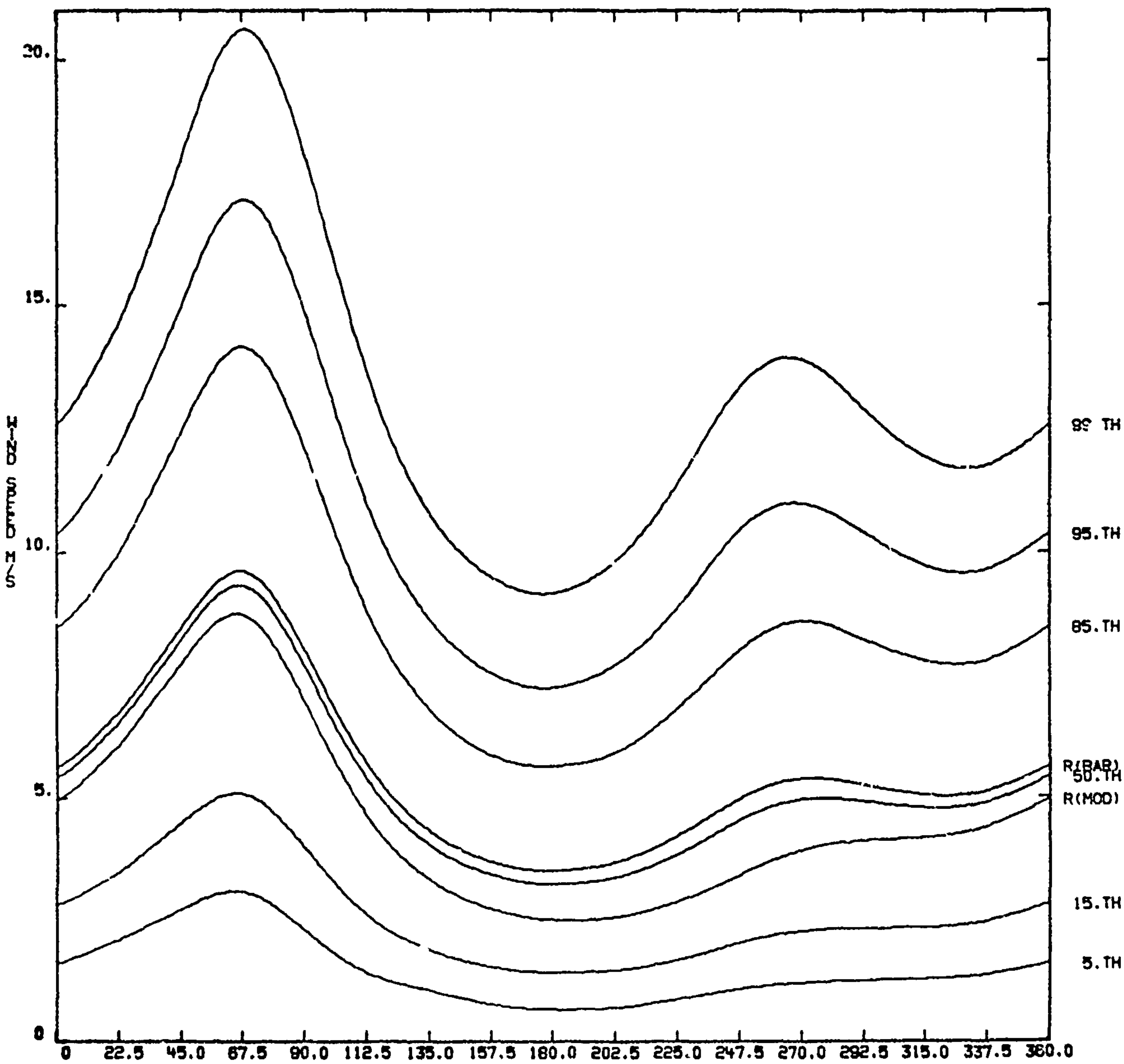


Fig. A-68

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

STATION=EGLIN MONTH=JUL ALT=20KM

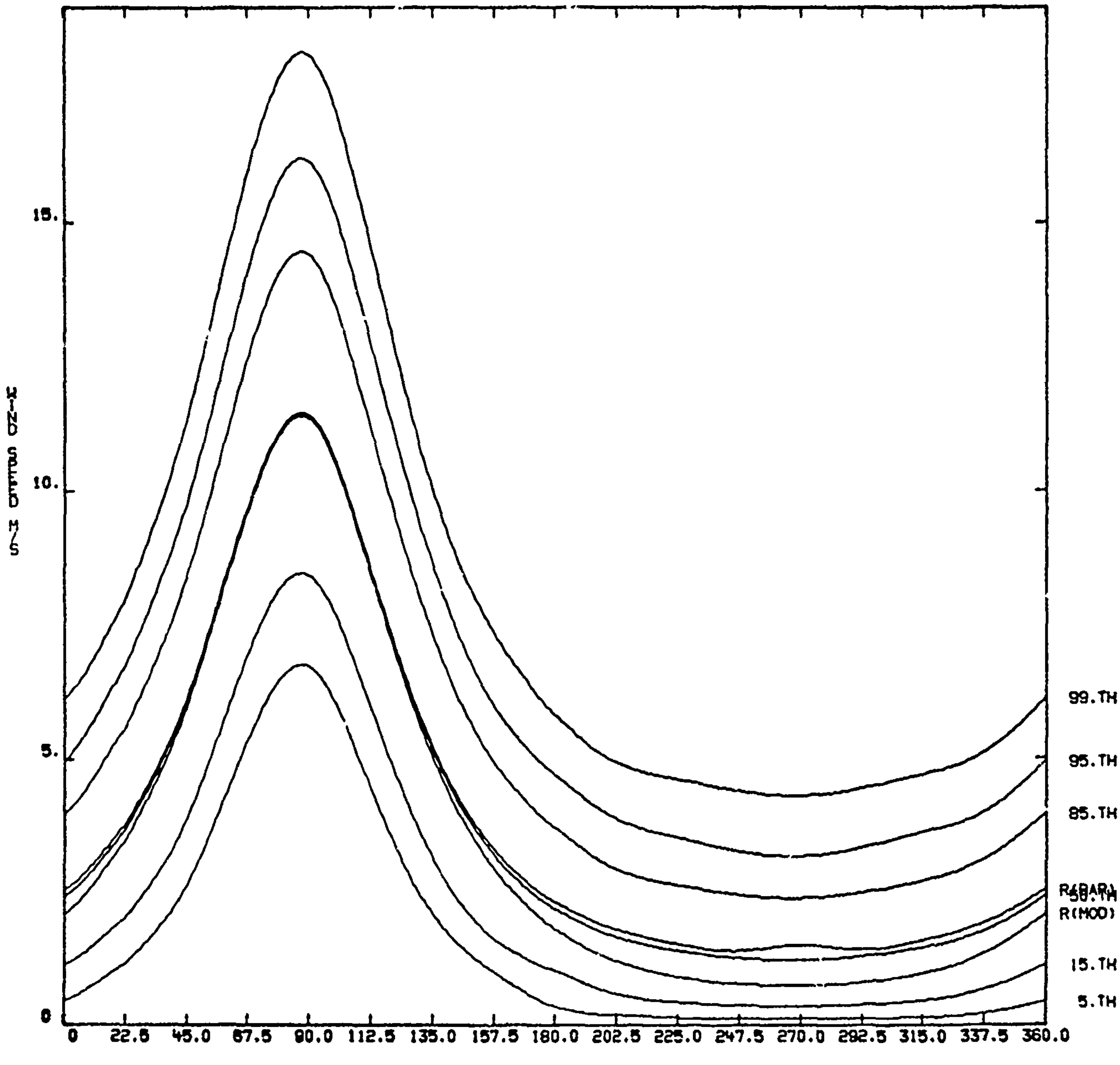


Fig. A-69

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

STATION=EGLIN   MONTH=JUL   ALT=24KM

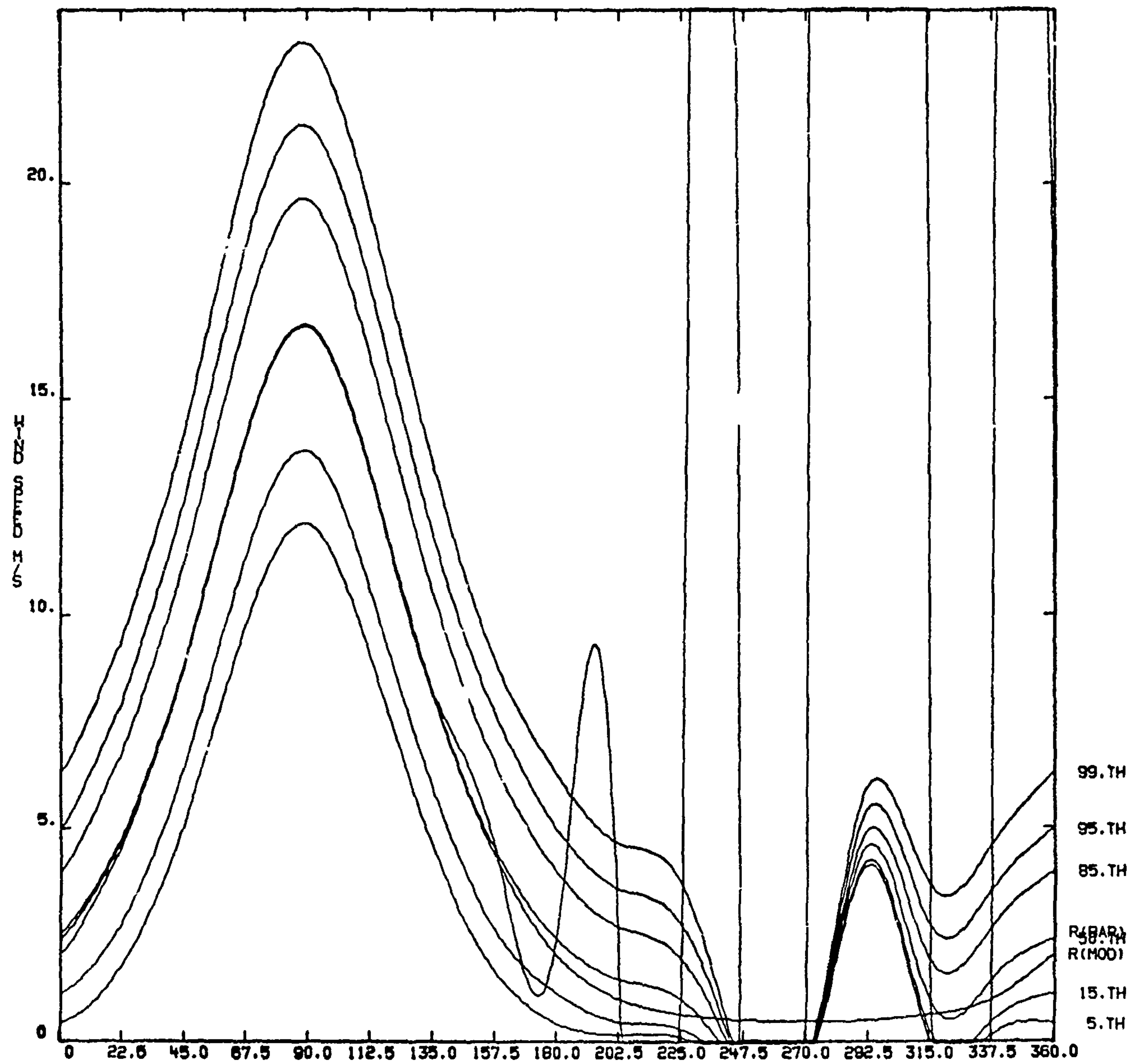
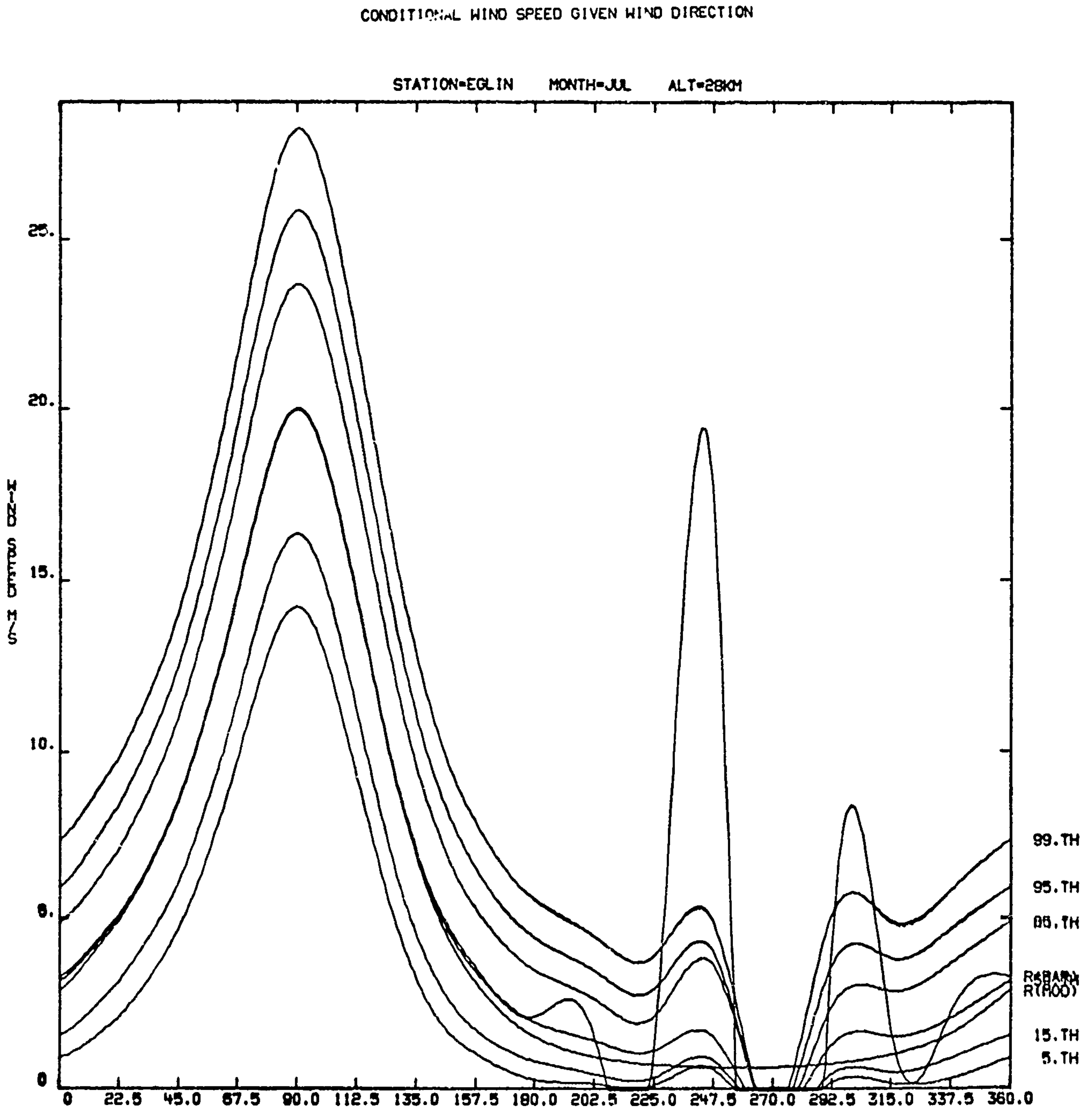


Fig. A-70



CONDITIONAL WIND SPEED GIVEN WIND DIRECTION
STATION=EGLIN MONTH=JUL ALT=28KM
WIND SPEED M/S
25.
20.
15.
10.
5.
0
0 22.5 45.0 67.5 90.0 112.5 135.0 157.5 180.0 202.5 225.0 247.5 270.0 292.5 315.0 337.5 360.0
99.TH
95.TH
85.TH
R(MOD)
15.TH
5.TH

Fig. A-71

CONDITIONAL WIND SPEED GIVEN WIND DIRECTION

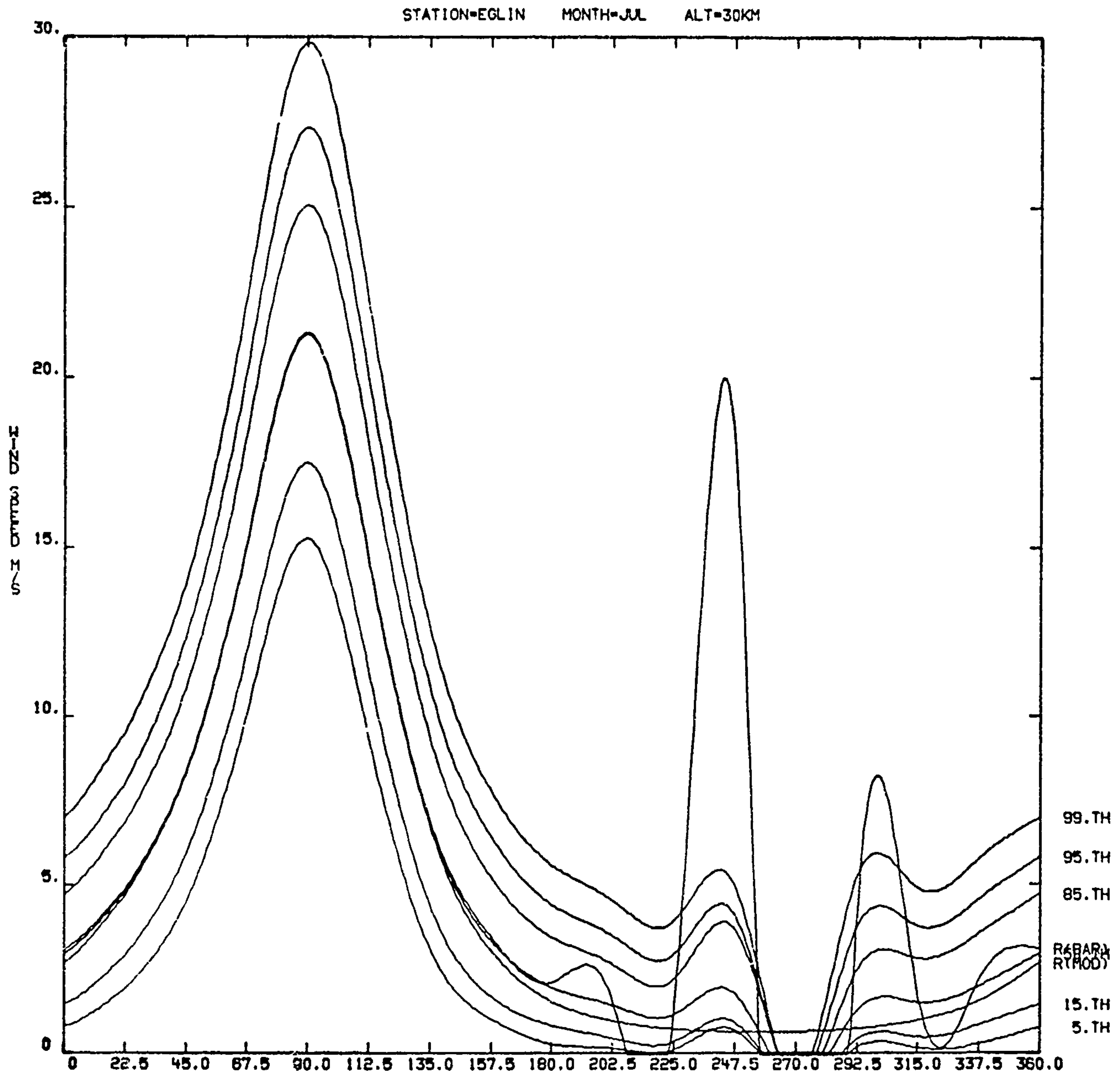


Fig A-72

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APPENDIX B

RANGE SPECIFIC INFORMATION AND THERMODYNAMIC QUANTITIES FOR EGLIN AIR FORCE BASE, CALIFORNIA

1. Range Specific Information

To prevent further character size reduction for tables I through IV, certain range-specific information has been omitted. This important information is given in table B-1.

TABLE B-1

Header Record 0-30 Km

Table Number	0
Data Source (1 = DATSAV, 2 = WDC-A)	1
Call Letters	VPS
WMO Number	722210
Latitide	30.29
Direction (N or S)	N
Longitude	83.31
Direction (E or W)	W
Elevation in Meters	20
Start Period of Record (Mo-Yr)	160
End Period of Record (Mo-Yr)	1279
No. of Time Windows (0,1 or 2)	2
Start Time Window #1 (Hr-MNZ)	2200
End Time Window #1	200
Start Time Window #2	1000
End Time Window #2	1400
Date of RRA	1080
Altitude Range of RRA Low Level (Km)	0
Altitude Range of RRA High Level (Km)	30
Standard Deviation of Thermodynamic Limits	6.0
Wind Limits	6.0

2. Thermodynamic Quantities

This section presents examples of further computations and graphical displays of pressure, density, and virtual temperature statistics that can be derived from data given in tables II, III, and IV. No attempt is made to present complete nor exhaustive illustrations that can be made to aid in visualizing the relationships that can be made from the data in tables II and IV. The choices are those that aided the committee to verify the reasonableness of the tabulations.

2.1 Monthly Means from the Annual Mean

The hydrostatic model values in table IV are used to compute (1) the monthly mean differences relative to the annual mean values of pressure,

density, and virtual temperature expressed in percent and (2) the monthly mean difference in virtual temperature for the annual mean virtual temperature expressed in degrees Kelvin. Examples of these four statistics are given in table B-2 for January and table B-3 for July. Graphical displays of the four statistics contained in tables B-2 and B-3 are shown in figures B-1 through B-8. Also, the relative differences between the monthly mean values from table IV-1 through IV-12 for all months from the annual mean values (table IV-13) are illustrated in figure B-9 for pressure, in figure B-10 for density, and in figure B-11 for virtual temperature. The monthly mean virtual temperature di,ferences from the annual mean virtual temperature for all months are given in figure B-12. The simple sum of the monthly mean differences from the annual mean values of these quantities is not zero. This is because the annual mean statistical parameters are computed (see section III, C.3) by weighting the monthly means by the number of observations in each month.

2.2 Coefficients of Variation and Derived Correlation Coefficients

The coefficient of variation, C_V, is defined by the standard deviation with respect to the mean divided by the mean. The coefficients of variation for pressure, C_VP, and density, C_VD, were computed using the standard deviations from table II and the hydrostatic mean values from table IV. The coefficient of variation for temperature uses the standard deviations of virtual temperature from table III to the altitude where virtual temperature exists. Above this altitude, the standard deviations of temperature are from table II. The mean values for temperature (virtual temperature to the altitude where it exists) are taken from table IV. No distinction is made in the table headings in table B-4 (January) and table B-5 (July) and all related figures between virtual temperature and temperature.

From the coefficients of variation for pressure, density, and temperature (virtual temperature to the altitude where it exists), the correlation coefficients between these quantities are derived using Buell's method (see reference in text). The equations for these derived correlation coefficients are

$$r(P,T) = \frac{(C_VT)^2 + (C_VP)^2 - (C_VD)^2}{2\,[C_VT \cdot C_VP]} , \qquad \text{(B-1)}$$

$$r(P,D) = \frac{(C_VD)^2 - (C_VT)^2 + (C_VP)^2}{2\,[C_VP \cdot C_VD]} , \qquad \text{(B-2)}$$

$$r(T,D) = \frac{(C_VP)^2 - (C_VD)^2 - (C_VT)^2}{2\,[C_VT \cdot C_VD]} . \qquad \text{(B-3)}$$

The correlation coefficients in tables B-4 and B-5 are derived from the above equations.

A test for the validity of the derived correlation coefficients is that all three of the following inequalities be satisfied.

$$C_VP - [C_VD + C_VT] < 0$$

$$C_VD - [C_VT + C_VP] < 0 \tag{B-4}$$

$$C_VT - [C_VP + C_VD] < 0$$

In these examples (tables B-4 and B-5) the numerical values from equation (B-4) are all negative; hence, the derived correlation test is considered valid. The rare exceptions to this test for several RRAs occur at the extreme highest altitudes, where samples sizes for the statistical sample are small.

The statistical parameters from table B-4 (January) and table B-5 (July) are illustrated in figures B-13 through B-16.

For all months the C_VP values are shown in figure B-17, the C_VD values are shown in figure B-18, and C_VT values are shown in figure B-19. If the abscissa on the figures for the coefficient of variation were multiplied by 100, these figures would show the percentage of the random dispersion of these quantities over the month with respect to the monthly mean for these thermodynamic quantities.

The derived correlation coefficients for all months are illustrated in the following figures:

a) Figure B-20 gives r(P,D).

b) Figure B-21 gives r(P,T).

c) Figure B-22 gives r(T,D).

TABLE B-2

STATION 722210 MONTH 1
DELTAS IN PERCENT RELATIVE TO ANNUAL

LEVEL	PRESSURE	DENSITY	TEMP.	TMO-TANN(DEG.K)
.000	.30	3.65	-3.23	-9.51
.020	.31	3.57	-3.16	-9.27
1.000	-.02	2.39	-2.32	-6.73
2.000	-.27	1.43	-1.67	-4.76
3.000	-.46	1.01	-1.46	-4.07
4.000	-.64	.76	-1.38	-3.78
5.000	-.81	.58	-1.39	-3.71
6.000	-1.00	.49	-1.49	-3.89
7.000	-1.20	.38	-1.58	-4.02
8.000	-1.43	.30	-1.72	-4.25
9.000	-1.67	.17	-1.83	-4.39
10.000	-1.94	-.10	-1.84	-4.28
11.000	-2.19	-.64	-1.58	-3.56
12.000	-2.39	-1.39	-1.01	-2.20
13.000	-2.47	-2.39	-.12	-.25
14.000	-2.44	-3.03	.58	1.21
15.000	-2.35	-2.91	.55	1.14
16.000	-2.29	-2.48	.17	.34
17.000	-2.30	-2.04	-.31	-.63
18.000	-2.40	-1.58	-.88	-1.80
19.000	-2.58	-1.35	-1.30	-2.71
20.000	-2.80	-1.32	-1.50	-3.16
21.000	-3.04	-1.57	-1.49	-3.17
22.000	-3.26	-1.87	-1.42	-3.06
23.000	-3.48	-2.06	-1.45	-3.15
24.000	-3.70	-2.26	-1.47	-3.23
25.000	-3.93	-2.41	-1.55	-3.43
26.000	-4.16	-2.63	-1.59	-3.54
27.000	-4.40	-2.81	-1.61	-3.62
28.000	-4.63	-3.13	-1.56	-3.52
29.000	-4.86	-3.29	-1.61	-3.67
30.000	-5.09	-3.62	-1.56	-3.57

TABLE B-3

STATION 722210 MONTH 7
DELTAS IN PERCENT RELATIVE TO ANNUAL

LEVEL	PRESSURE	DENSITY	TEMP.	TMO-TANN(DEG.K)
.000	-.08	-2.90	2.85	8.39
.020	-.07	-3.07	3.03	8.90
1.000	.24	-2.02	2.39	6.93
2.000	.48	-1.30	1.81	5.15
3.000	.68	-.75	1.44	4.03
4.000	.85	-.51	1.36	3.73
5.000	1.03	-.48	1.52	4.06
6.000	1.24	-.52	1.77	4.63
7.000	1.49	-.51	2.00	5.08
8.000	1.77	-.46	2.26	5.59
9.000	2.10	-.32	2.44	5.86
10.000	2.45	.02	2.45	5.69
11.000	2.80	.61	2.17	4.88
12.000	3.08	1.54	1.52	3.32
13.000	3.23	2.83	.37	.79
14.000	3.21	3.95	-.72	-1.52
15.000	3.05	4.11	-1.04	-2.15
16.000	2.93	3.46	-.49	-1.00
17.000	2.91	2.61	.32	.65
18.000	3.03	1.89	1.09	2.25
19.000	3.23	1.89	1.30	2.70
20.000	3.44	2.16	1.27	2.68
21.000	3.65	2.43	1.19	2.53
22.000	3.83	2.74	1.05	2.26
23.000	3.99	2.93	1.02	2.22
24.000	4.16	3.08	1.05	2.30
25.000	4.33	3.25	1.05	2.33
26.000	4.49	3.41	1.06	2.36
27.000	4.65	3.59	1.06	2.37
28.000	4.82	3.72	1.07	2.41
29.000	4.98	3.89	1.03	2.35
30.000	5.13	4.16	.91	2.08

DELTA PERCENT RELATIVE TO ANNUAL PRESSURE

STATION = 722210 MONTH = 1

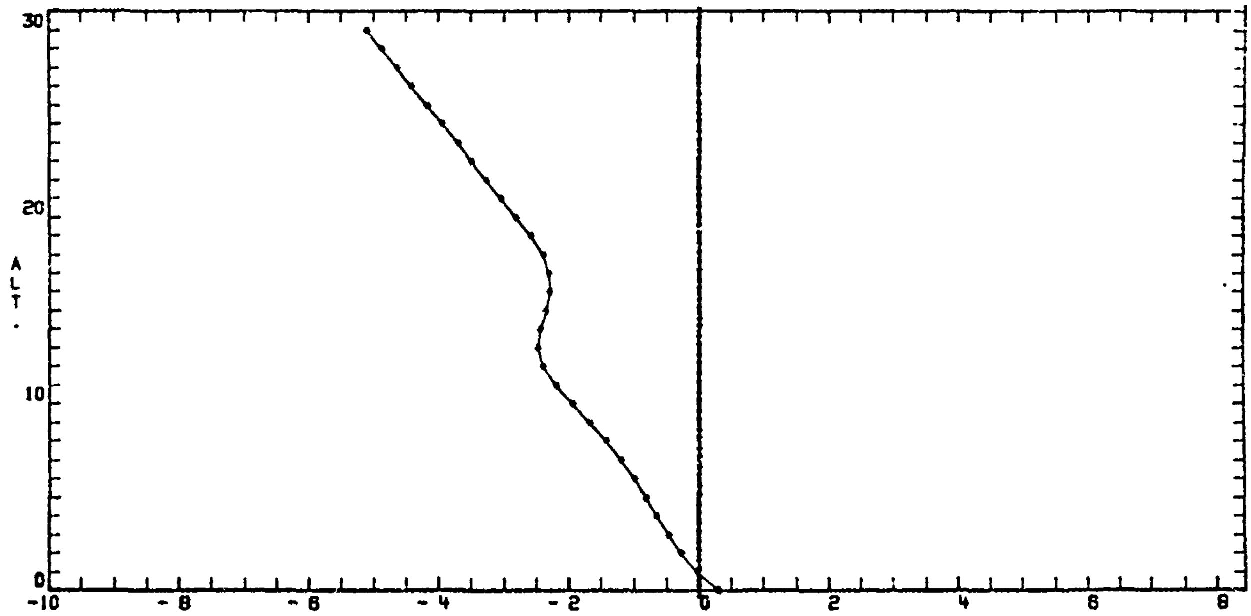


Fig. B-1

DELTA PERCENT RELATIVE TO ANNUAL DENSITY

STATION = 722210 MONTH = 1

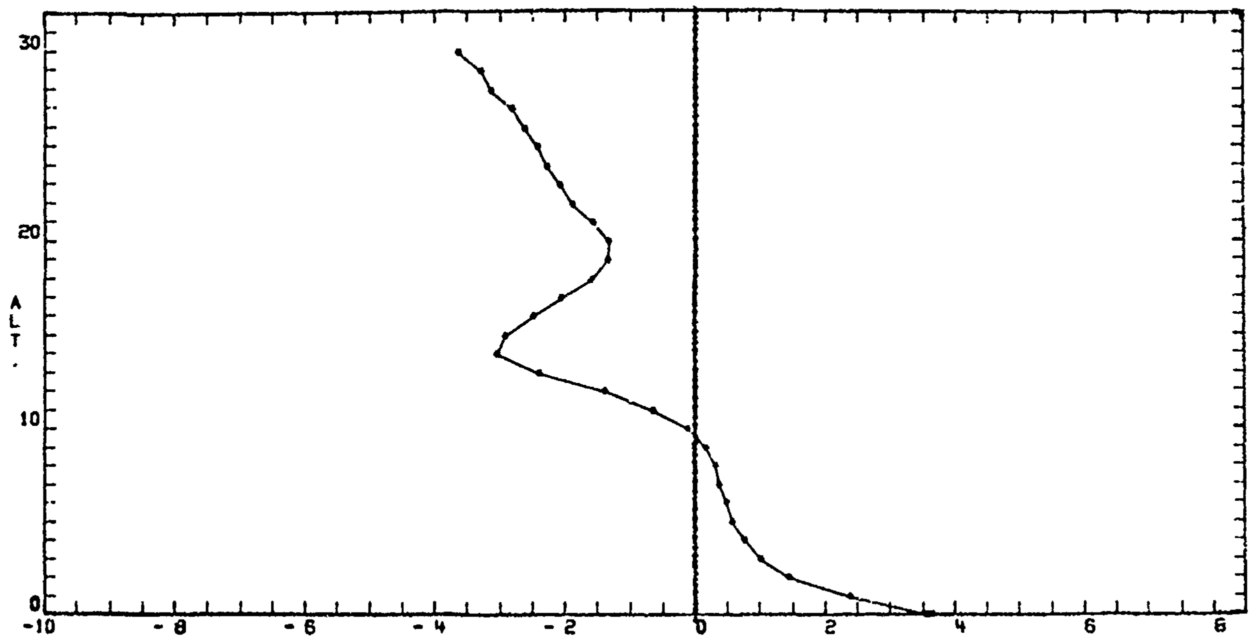
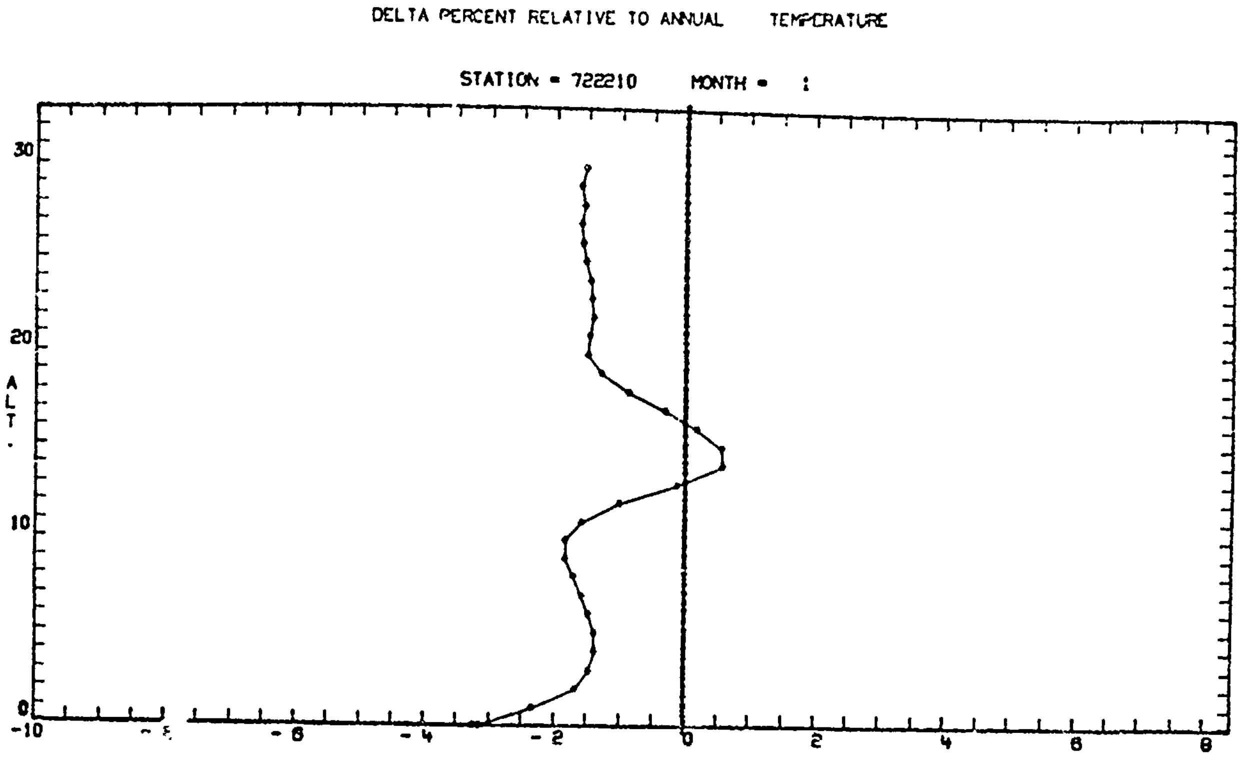
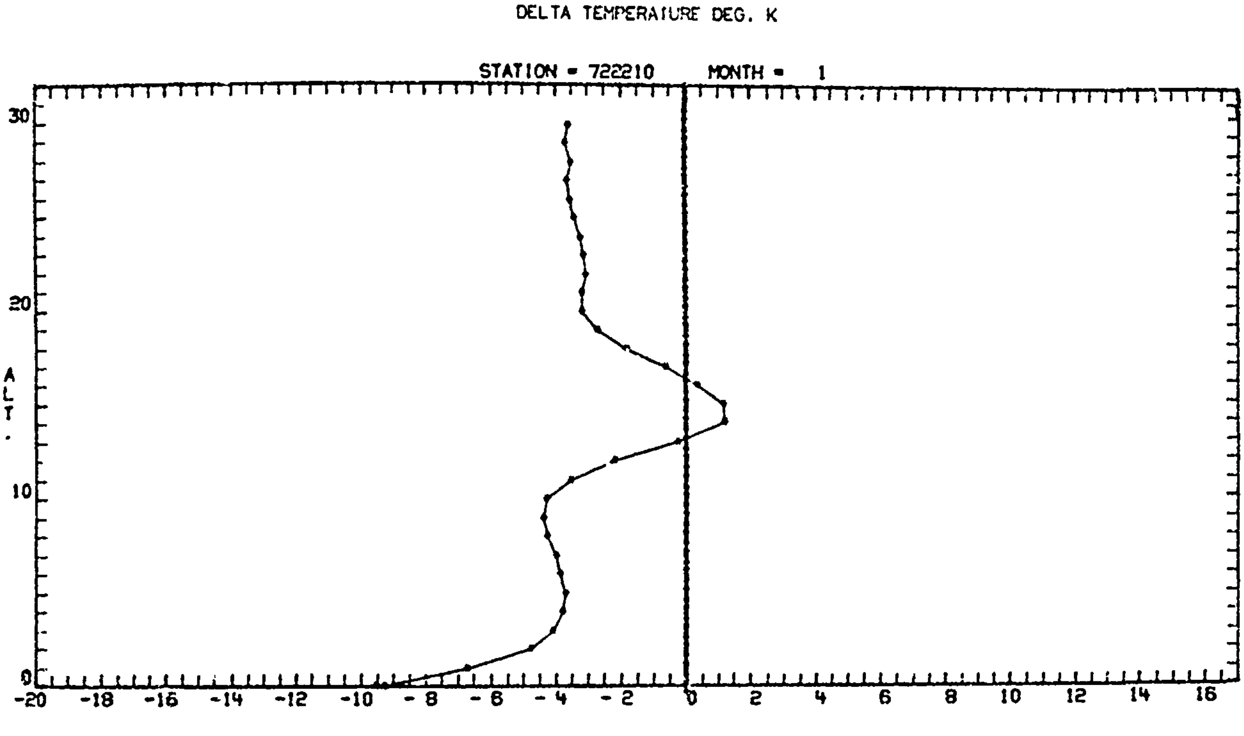


Fig. B-2


DELTA PERCENT RELATIVE TO ANNUAL TEMPERATURE
STATION = 722210 MONTH = 1
ALT.
30
20
10
0
-10
-8
-6
-4
-2
0
2
4
6
8
Fig. B-3


DELTA TEMPERATURE DEG. K
STATION = 722210 MONTH = 1
ALT.
30
20
10
0
-20
-18
-16
-14
-12
-10
-8
-6
-4
-2
0
2
4
6
8
10
12
14
16
Fig. B-4

DELTA PERCENT RELATIVE TO ANNUAL PRESSURE

STATION = 722210 MONTH = 7

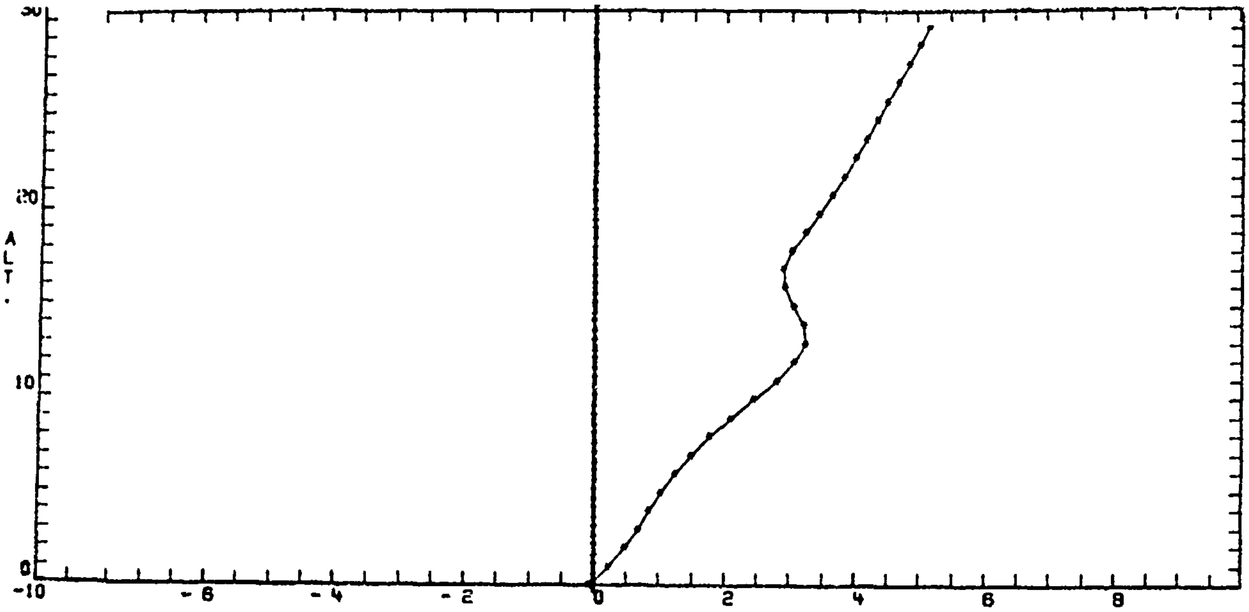


Fig. R-5

DELTA PERCENT RELATIVE TO ANNUAL DENSITY

STATION = 722210 MONTH = 7

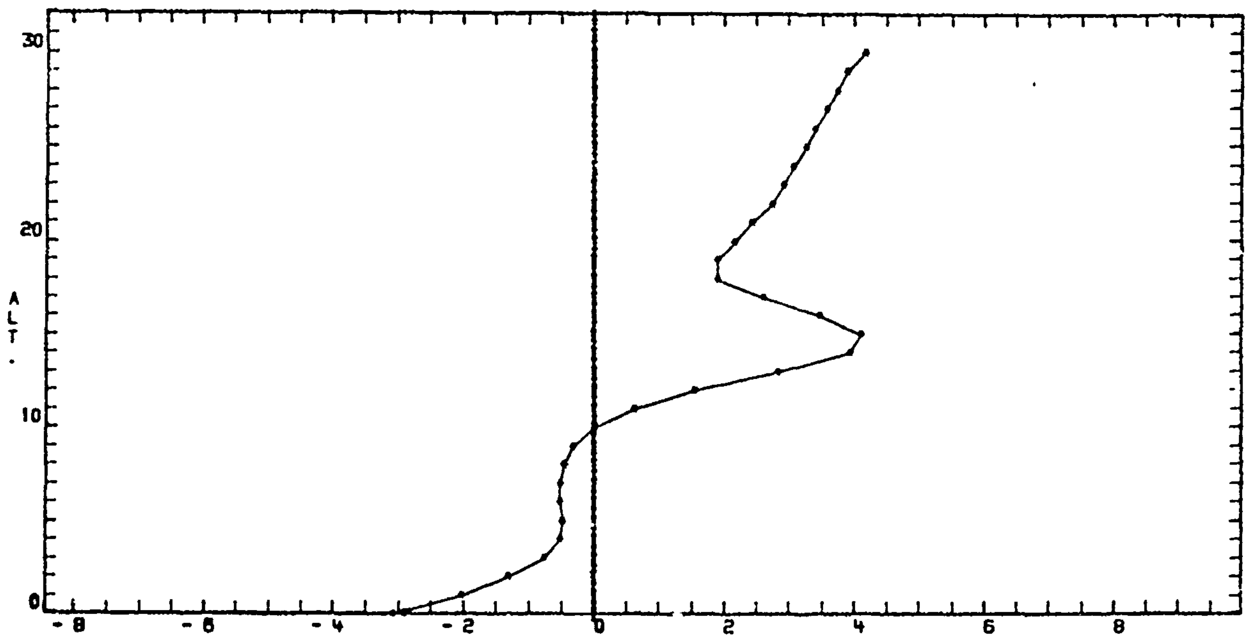


Fig. 3-6

DELTA PERCENT RELATIVE TO ANNUAL TEMPERATURE

STATION = 722210 MONTH = 7

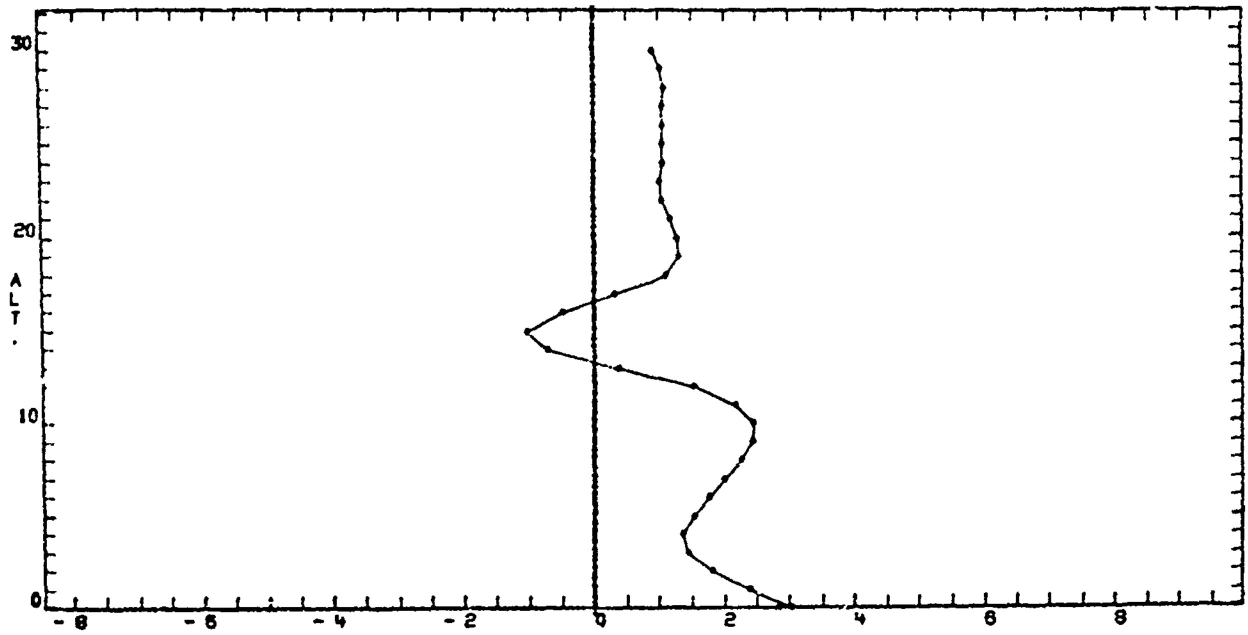


Fig. B-7

DELTA TEMPERATURE DEG. K

STATION = 722210 MONTH = 7

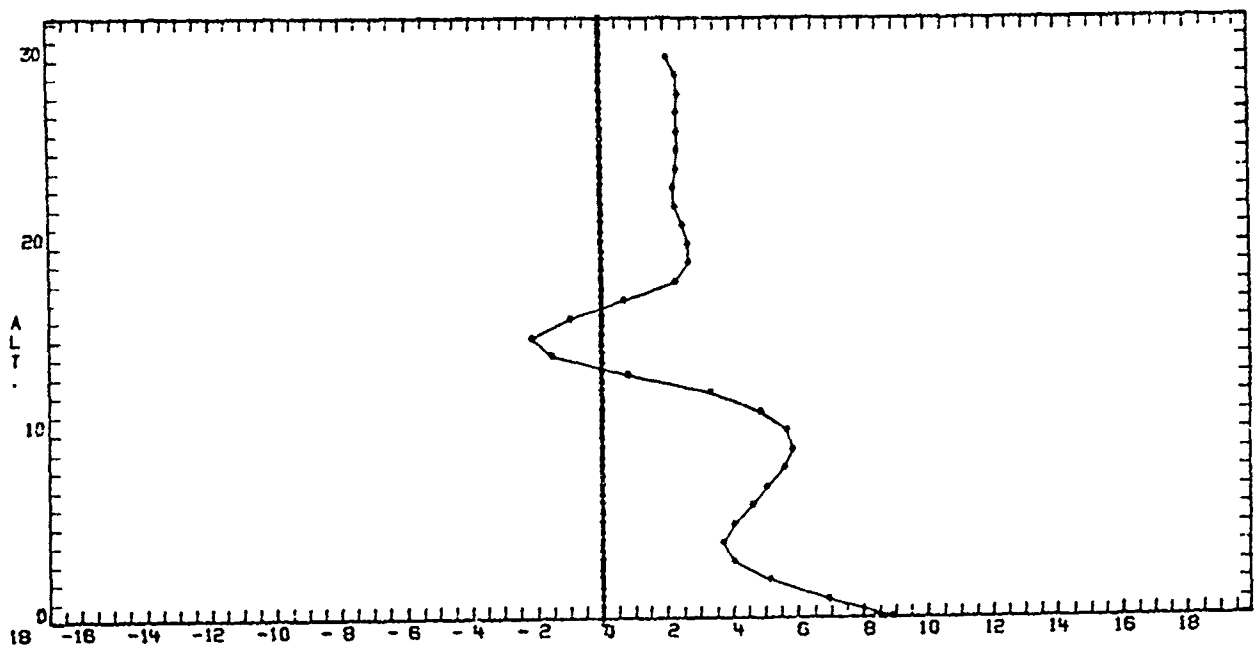


Fig. B-8

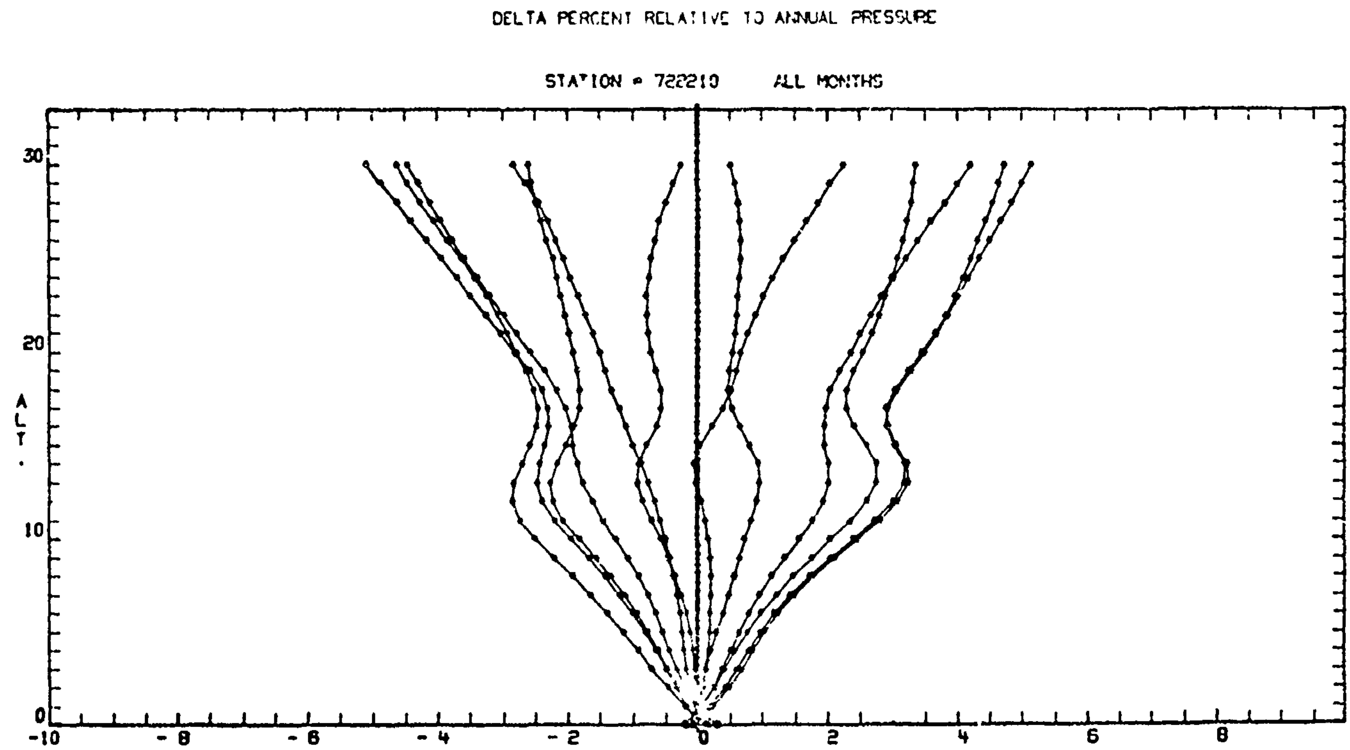


Fig. B-9

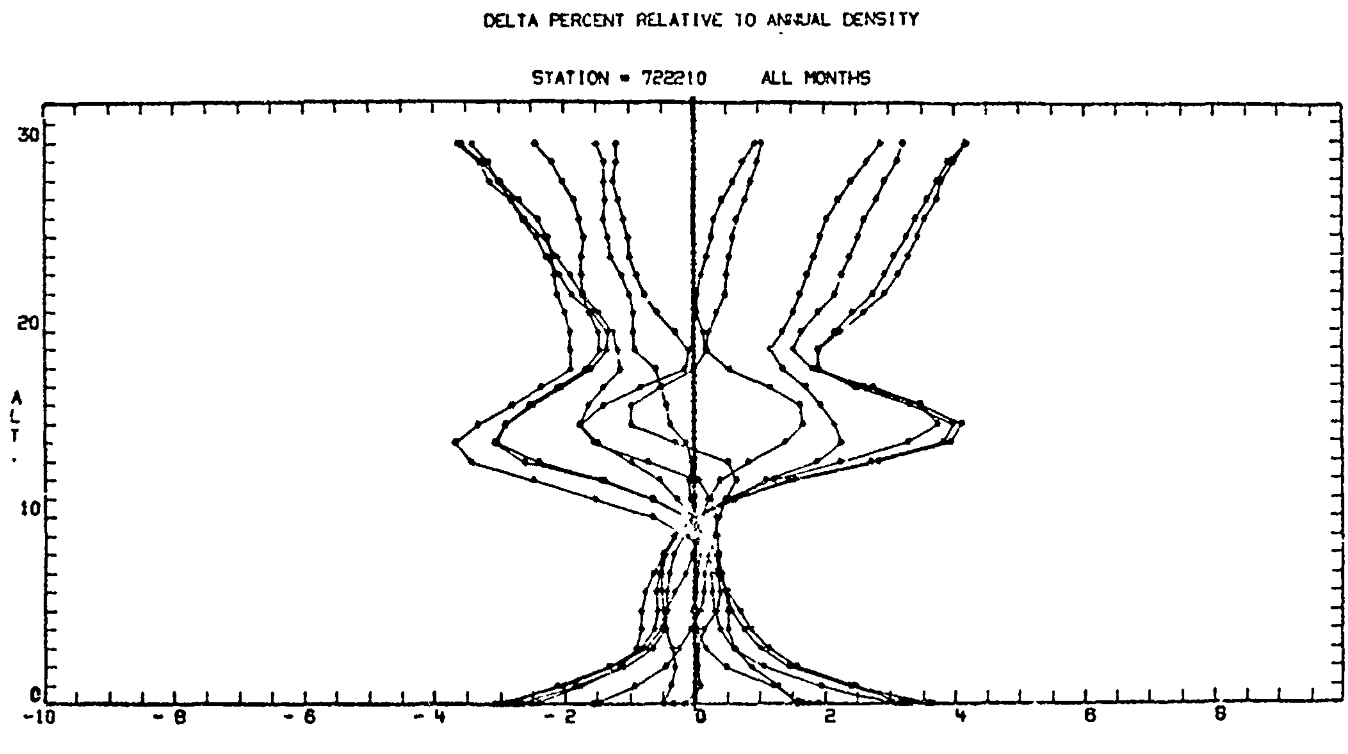


Fig. B-10

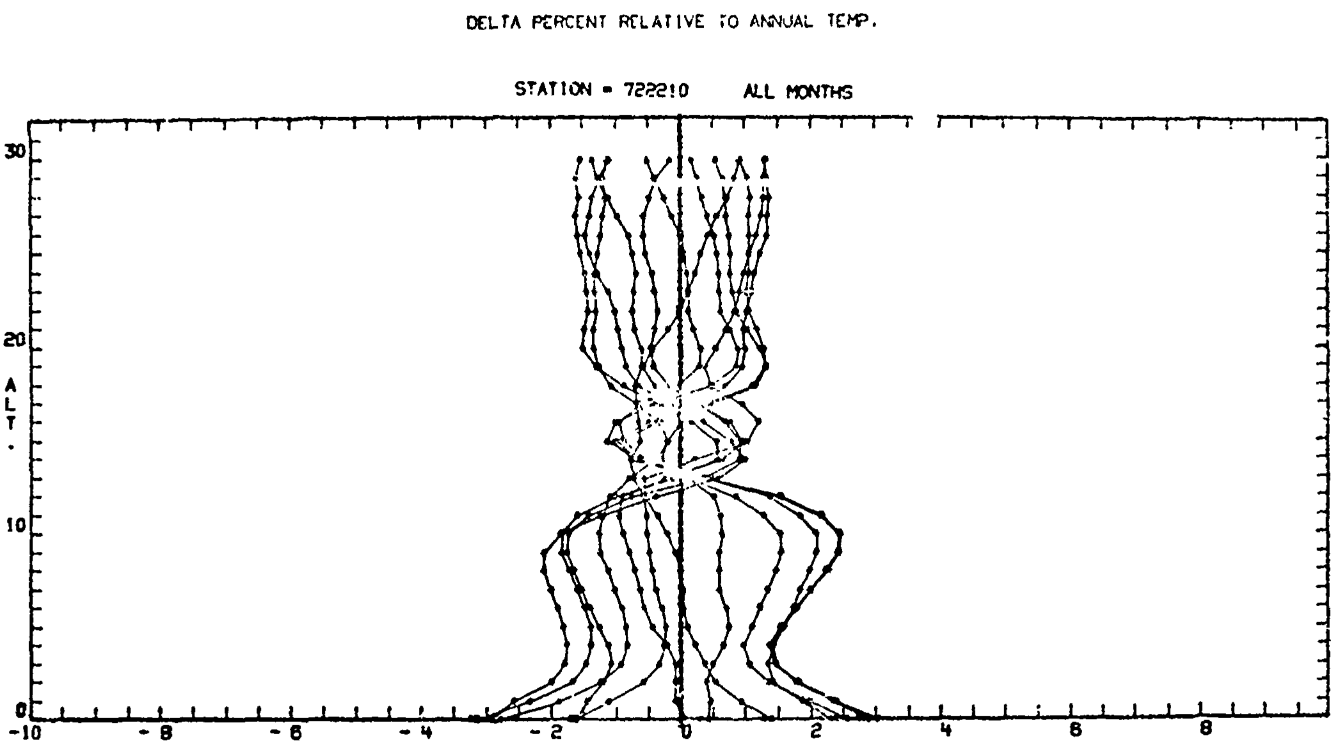


Fig. B-11

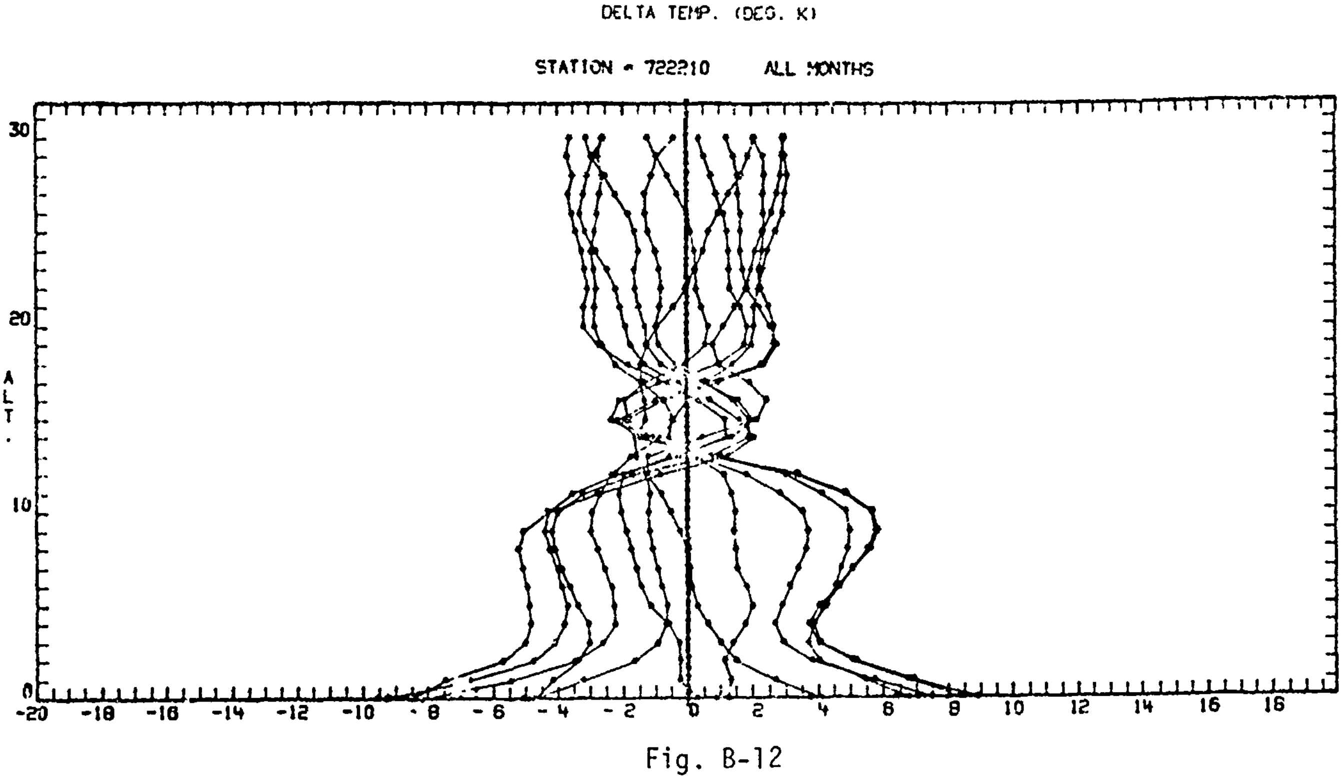


Fig. B-12

TABLE B-4

STATION 722210 MONTH 7

LEVEL	CVP	CVD	CVT	R(P,T)	R(P,D)	R(T,D)	DCVP	DCVD	DCVT
.000	.0026	.0126	.0118	-.1864	.3853	-.9784	-.0217	-.0019	-.0034
.020	.0027	.0125	.0117	-.1898	.3906	-.9780	-.0215	-.0019	-.0034
1.000	.0026	.0059	.0055	.0504	.3913	-.8994	-.0088	-.0021	-.0031
2.000	.0027	.0051	.0047	.1614	.3941	-.8492	-.0071	-.0024	-.0030
3.000	.0028	.0046	.0043	.2208	.4054	-.8021	-.0061	-.0025	-.0031
4.000	.0030	.0049	.0048	.2724	.3457	-.8087	-.0067	-.0029	-.0031
5.000	.0032	.0051	.0050	.2947	.3301	-.8049	-.0070	-.0031	-.0032
6.000	.0034	.0053	.0056	.4021	.2177	-.8061	-.0075	-.0037	-.0031
7.000	.0038	.0052	.0060	.5109	.1311	-.7852	-.0075	-.0046	-.0030
8.000	.0042	.0053	.0066	.5954	.0527	-.7709	-.0077	-.0055	-.0029
9.000	.0048	.0057	.0076	.6616	-.0295	-.7690	-.0084	-.0067	-.0029
10.000	.0056	.0055	.0032	.7414	-.0832	-.7304	-.0081	-.0083	-.0030
11.000	.0056	.0051	.0085	.7953	-.0230	-.6243	-.0070	-.0100	-.0033
12.000	.0074	.0053	.0084	.779[illegible]	.1648	-.4894	-.0063	-.0105	-.0044
13 000	.0085	.0075	.0086	.6155	.4301	-.4468	-.0076	-.0096	-.0075
14.000	.0091	.0120	.0094	.1530	.6353	-.6059	-.0124	-.0065	-.0117
15.000	.0089	.0169	.0124	-.2295	.6977	-.8574	-.0204	-.0045	-.0134
16.000	.0082	.0171	.0130	-.2636	.6805	-.8862	-.0218	-.0041	-.0123
17.000	.0077	.0153	.0120	-.1537	.6261	-.8667	-.0196	-.0045	-.0109
18.000	.0077	.0126	.0103	.0456	.5726	-.7929	-.0153	-.0054	-.0100
19.000	.0078	.0105	.0086	.1720	.5965	-.6881	-.0114	-.0058	-.0097
20.000	.0080	.0099	.0078	.2129	.6400	-.6144	-.0097	-.0059	-.0102
21.000	.0081	.0102	.0081	.2073	.6325	-.6267	-.0101	-.0060	-.0102
22.000	.0085	.0095	.0073	.2824	.6747	-.5175	-.0083	-.0063	-.0106
23.000	.0088	.0092	.0073	.3588	.6732	-.4487	-.0077	-.0069	-.0107
24.000	.0092	.0098	.0077	.3413	.6734	-.4651	-.0083	-.0071	-.0113
25.000	.0097	.0097	.0074	.3796	.7119	-.3795	-.0074	-.0074	-.0121
26.000	.0101	.0101	.0075	.3708	.7244	-.3717	-.0075	-.0075	-.0126
27.000	.0103	.0110	.0088	.3536	.6583	-.4713	-.0094	-.0082	-.0125
28.000	.0109	.0099	.0076	.4735	.7410	-.2406	-.0056	-.0086	-.0133
29.000	.0119	.0110	.0092	.4696	.6793	-.3289	-.0084	-.0099	-.0137
30.000	.0125	.0105	.0085	.5528	.7419	-.1486	-.0065	-.0104	-.0145

TABLE B-5

STATION 722210 MONTH 1

LEVEL	CVP	CVD	CVT	R(P,T)	R(P,D)	R(T,D)	DCVP	DCVD	DCVT
.000	.0056	.0294	.0261	-.5298	.6591	-.9870	-.0499	-.0022	-.0089
.020	.0057	.0292	.0258	-.5244	.6587	-.9851	-.0492	-.0023	-.0091
1.000	.0052	.0214	.0209	.0216	.2211	-.9703	-.0371	-.0047	-.0057
2.000	.0058	.0139	.0154	.4394	-.0702	-.9269	-.0235	-.0073	-.0043
3.000	.0069	.0110	.0141	.6361	-.1869	-.8769	-.0182	-.0099	-.0039
4.000	.0081	.0094	.0136	.7345	-.20[illegible]	-.8118	-.0149	-.0123	-.0039
5.000	.0094	.0092	.0141	.7693	-.157[illegible]	-.7521	-.0139	-.0144	-.0044
6.000	.0108	.0090	.0145	.7811	-.0525	-.6646	-.0127	-.0162	-.0054
7.000	.0123	.0091	.0149	.7952	.0475	-.5679	-.0117	-.0182	-.0054
8.000	.0139	.0102	.0157	.7687	.1813	-.4897	-.0120	-.0194	-.0084
9.000	.0156	.0114	.0156	.7309	.3675	-.3660	-.0114	-.0197	-.011[illegible]
10.000	.0172	.0142	.0146	.6104	.5933	-.2874	-.0116	-.0175	-.0168
11.000	.0181	.0136	.0140	.2802	.7269	-.4556	-.0154	-.0126	-.0237
12.000	.0183	.0268	.0183	-.0782	.7340	-.7345	-.0269	-.0097	-.0268
13.000	.0179	.0289	.0188	-.2415	.7761	-.7993	-.0298	-.0078	-.0260
14.000	.0173	.0253	.0142	-.2778	.8415	-.7528	-.0222	-.0063	-.0284
15.000	.0164	.0249	.0133	-.4010	.8724	-.7976	-.0218	-.0048	-.0280
16.000	.0154	.0258	.0148	-.4577	.8608	-.8465	-.0251	-.0044	-.0265
17.000	.0143	.0260	.0165	-.4263	.8197	-.8676	-.0282	-.0048	-.0239
18.000	.0132	.0254	.0177	-.3454	.7583	-.8737	-.0299	-.0054	-.0210
19.000	.0124	.0220	.0162	-.1681	.6877	-.8312	-.0259	-.0066	-.0182
20.000	.0123	.0186	.0139	-.0046	.6640	-.7507	-.0202	-.0076	-.0170
21.000	.0125	.0164	.0128	.1561	.6388	-.6602	-.0157	-.0089	-.0161
22.000	.0130	.0153	.0129	.2979	.5956	-.5893	-.015[illegible]	-.0105	-.0154
23.000	.0138	.0146	.0126	.3890	.6081	-.4949	-.0134	-.0118	-.0158
24.000	.0146	.0145	.0129	.4476	.6067	-.4393	-.0128	-.0130	-.0162
25.000	.0155	.0150	.0130	.4601	6326	-.3966	-.0125	-.0136	-.0174
26.000	.0165	.0158	.0132	.4553	.6676	-.3589	-.0124	-.0139	-.0191
27.000	.0173	.0169	.0141	.4332	.6609	-.3901	-.0137	-.0145	-.0201
28.000	.0183	.0191	.0166	.4069	.6053	-.4808	-.0171	-.0159	-.0208
29.000	.0186	.0185	.0166	.4514	.6010	-.4419	-.0165	-.0167	-.0206
30.000	.0198	.0193	.0170	.4611	.6213	-.4088	-.0155	-.0176	-.0221

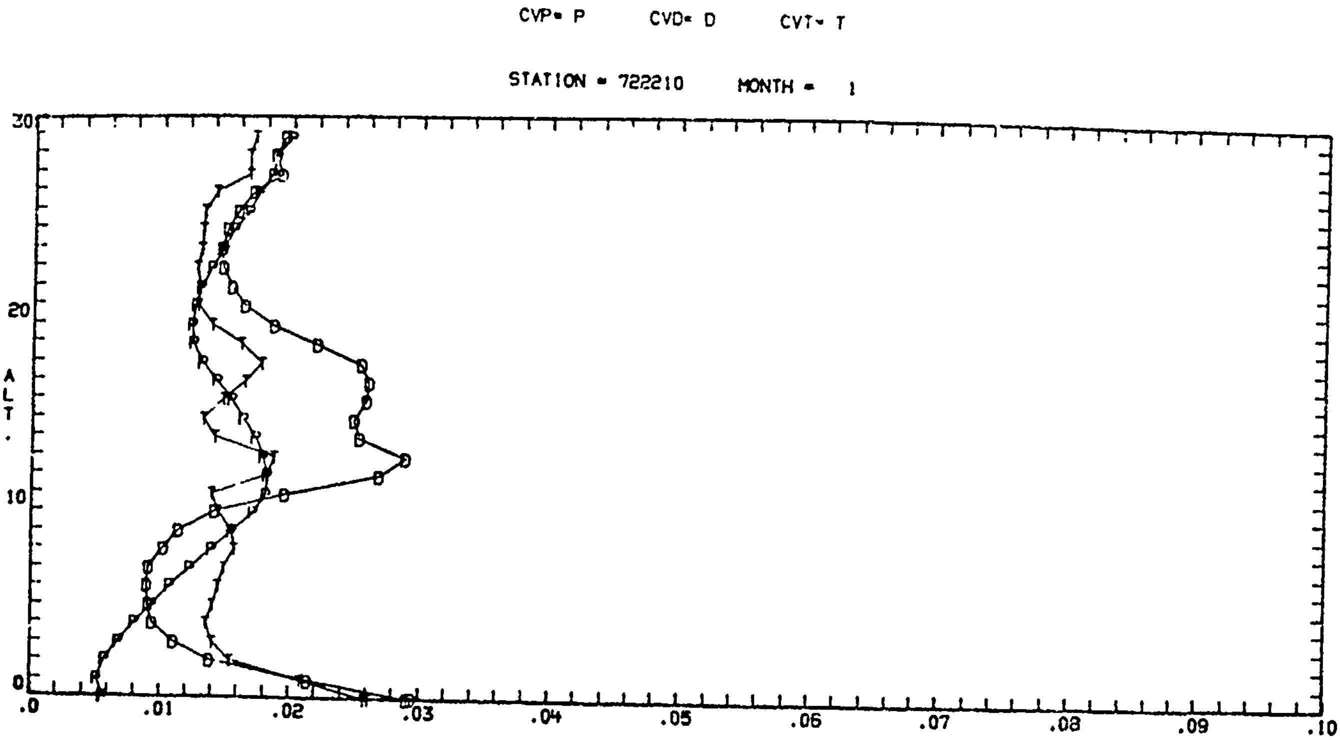


Fig. B-13

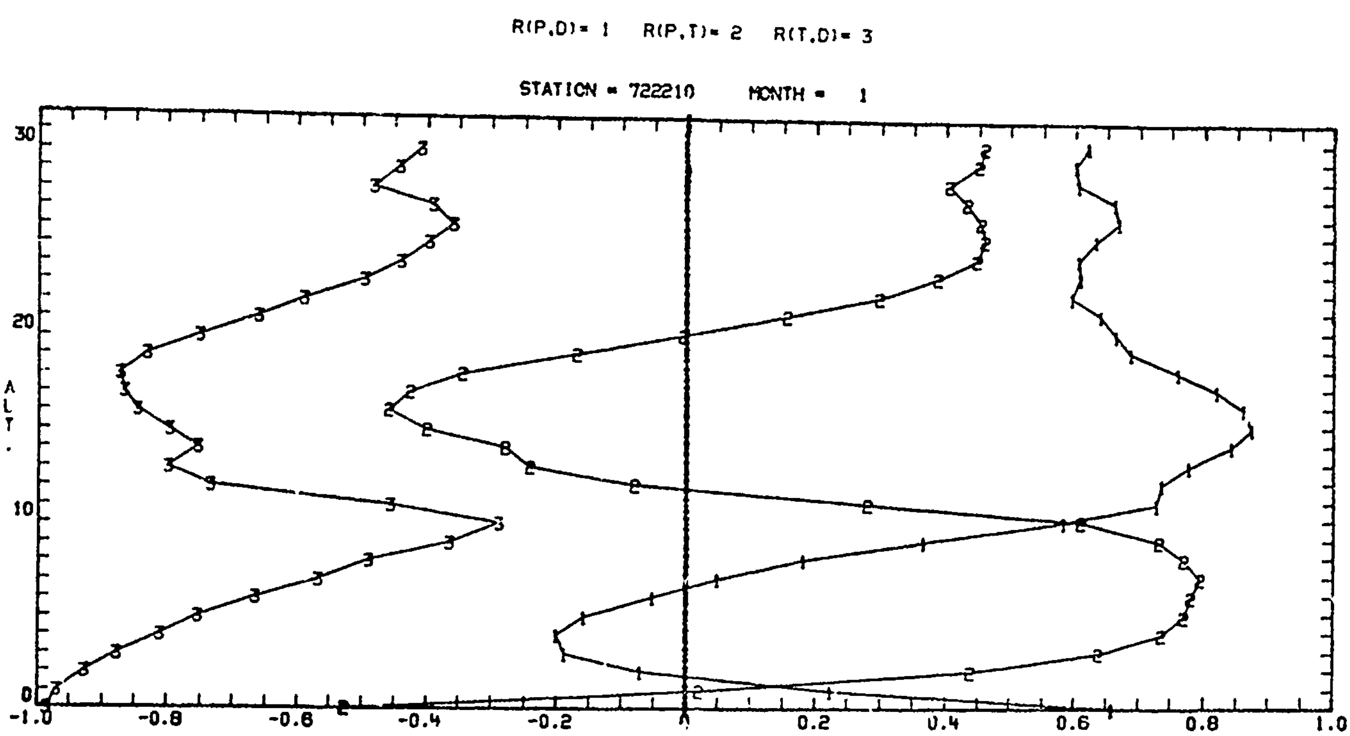


Fig. B-14

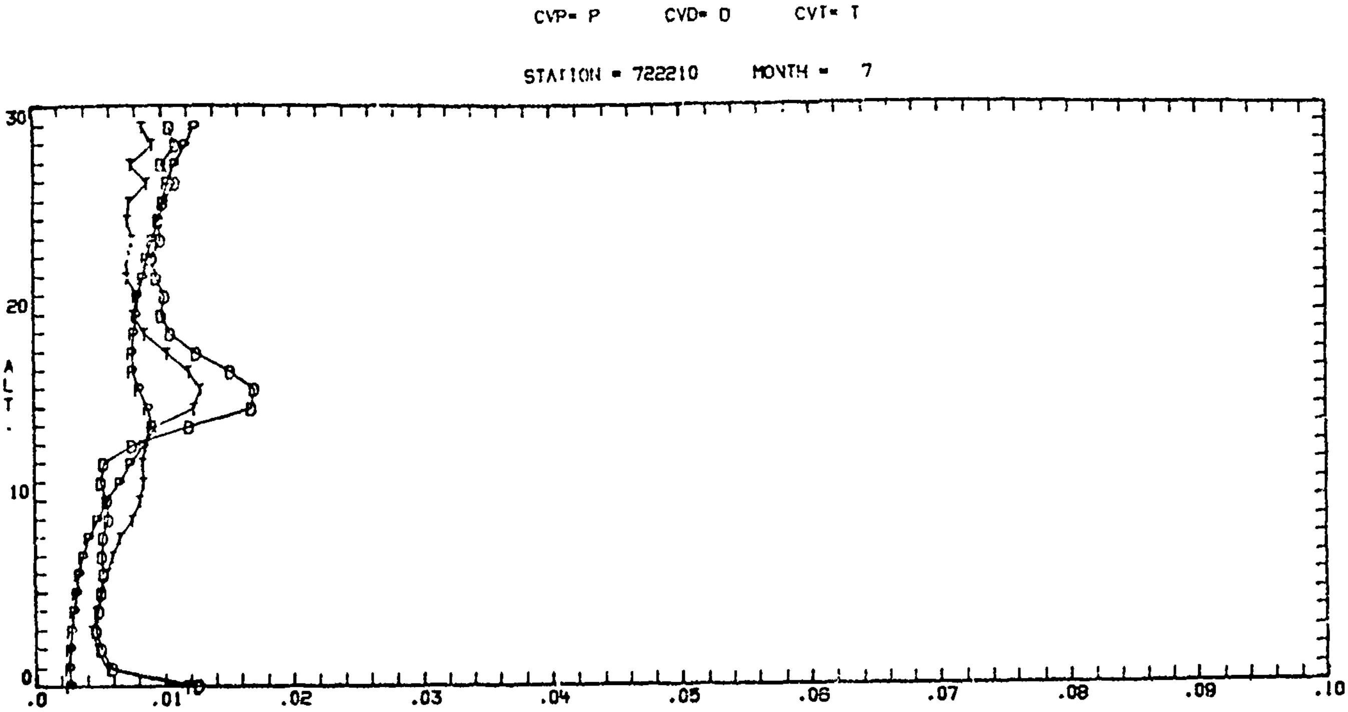


Fig. B-15

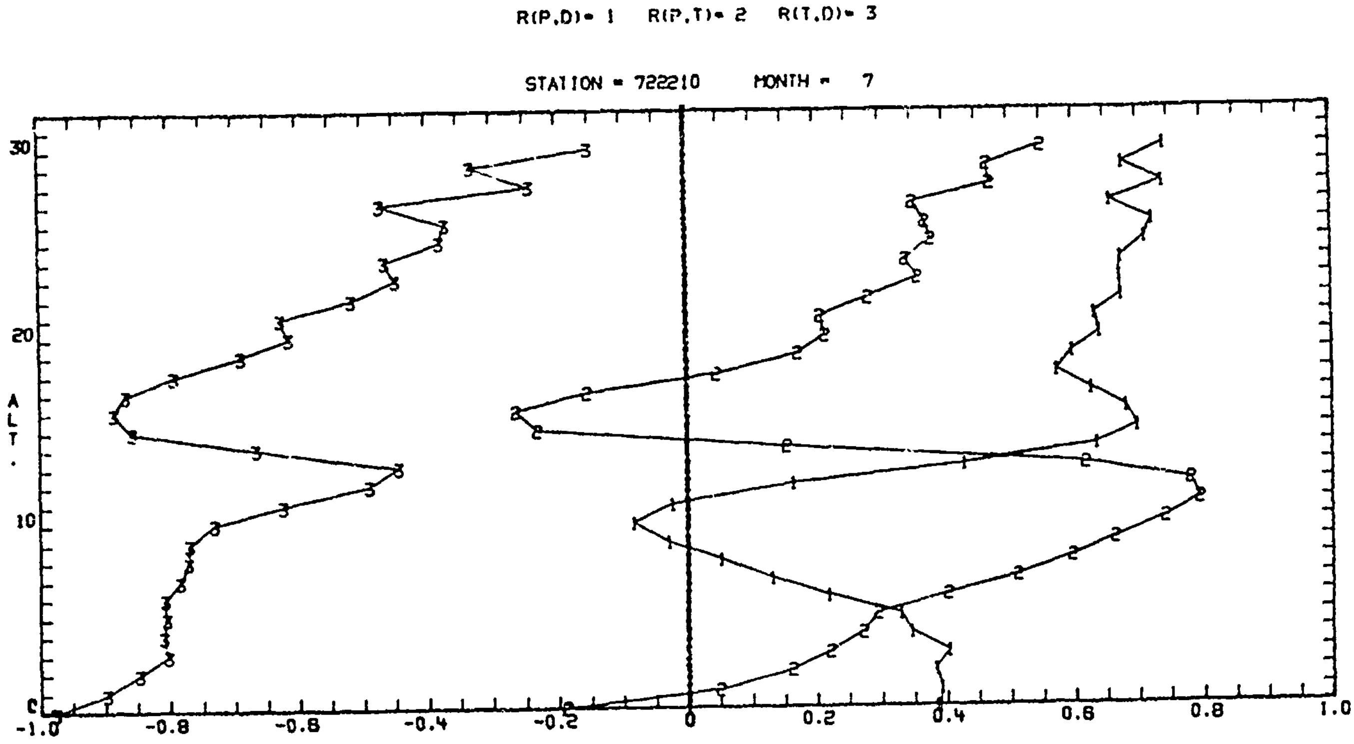


Fig. B-16

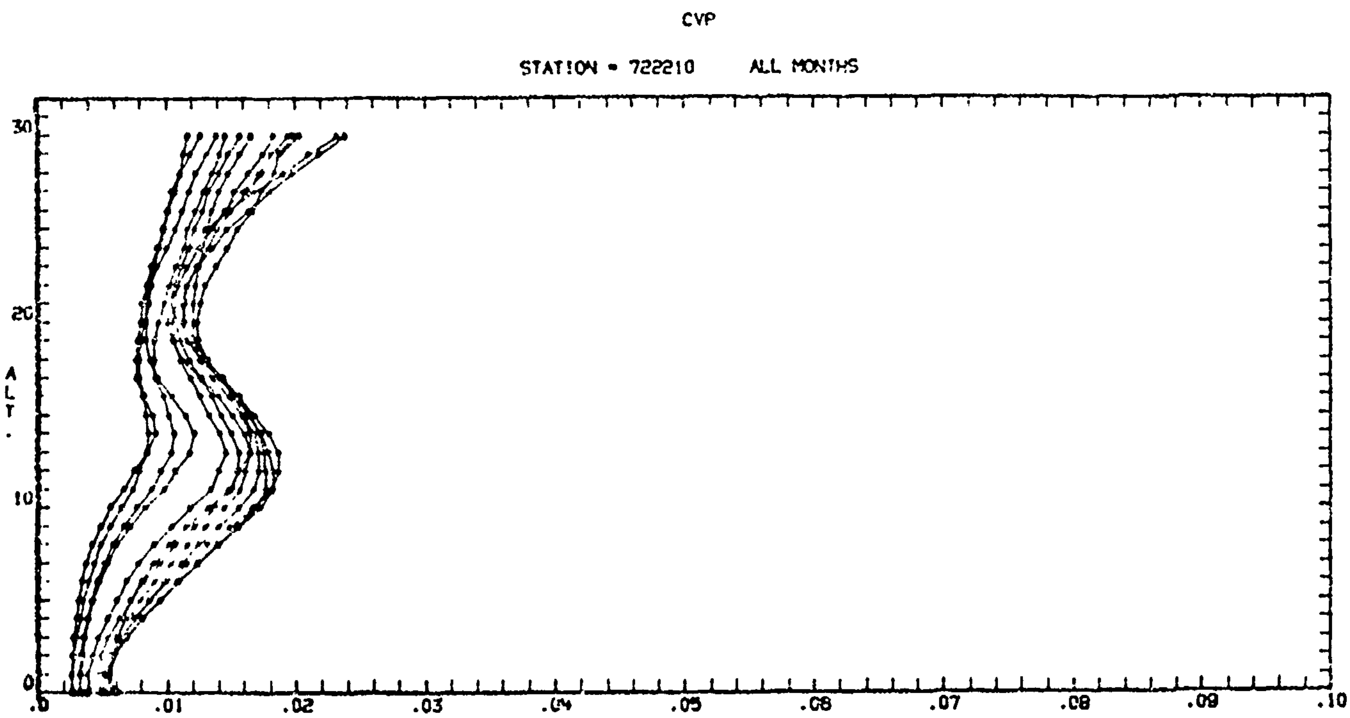


Fig. B-17

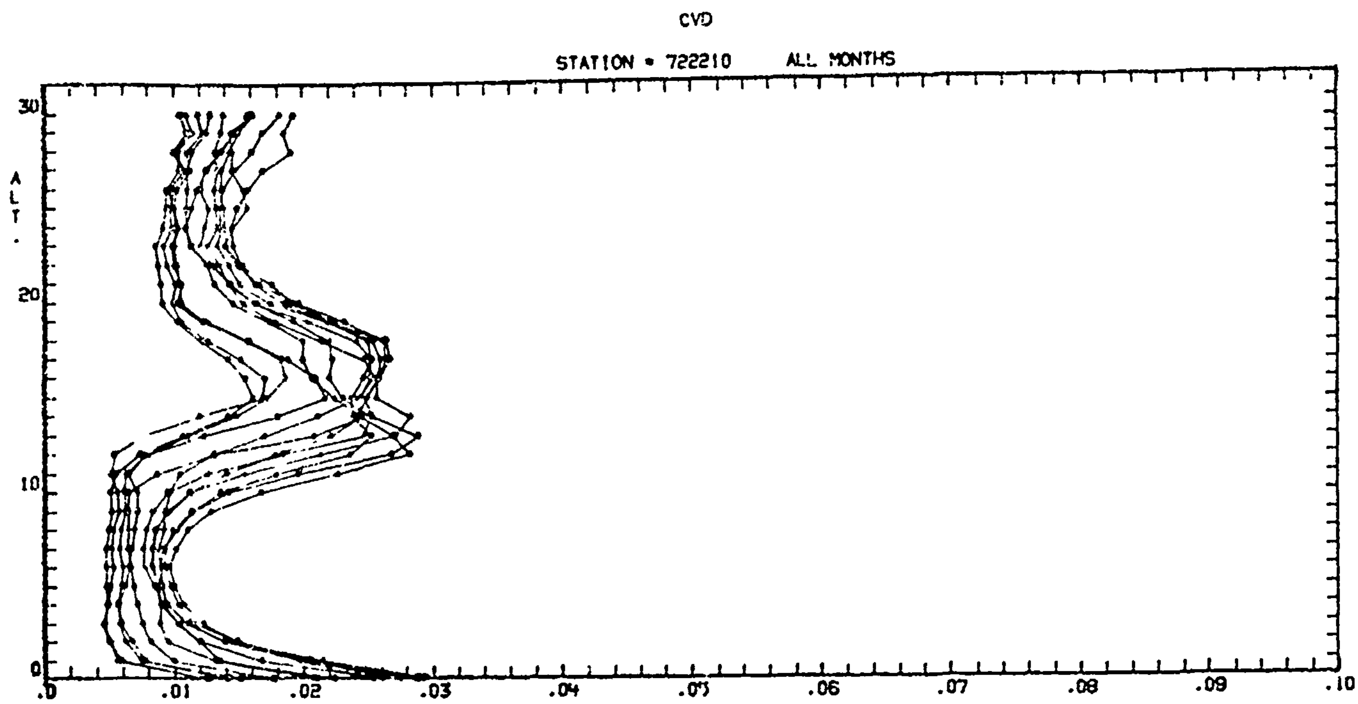


Fig. B-18

CVT

STATION = 722210 ALL MONTHS

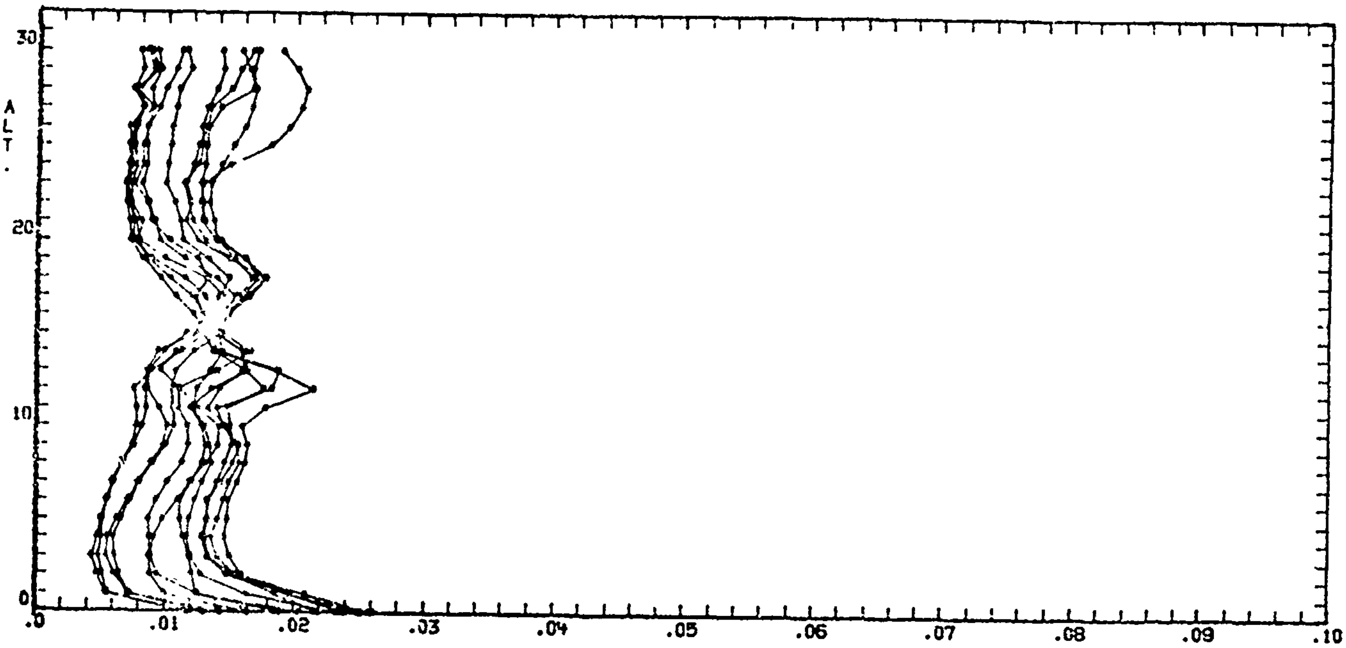


Fig. B-19

R(P,D)

STATION = 722210 ALL MONTHS

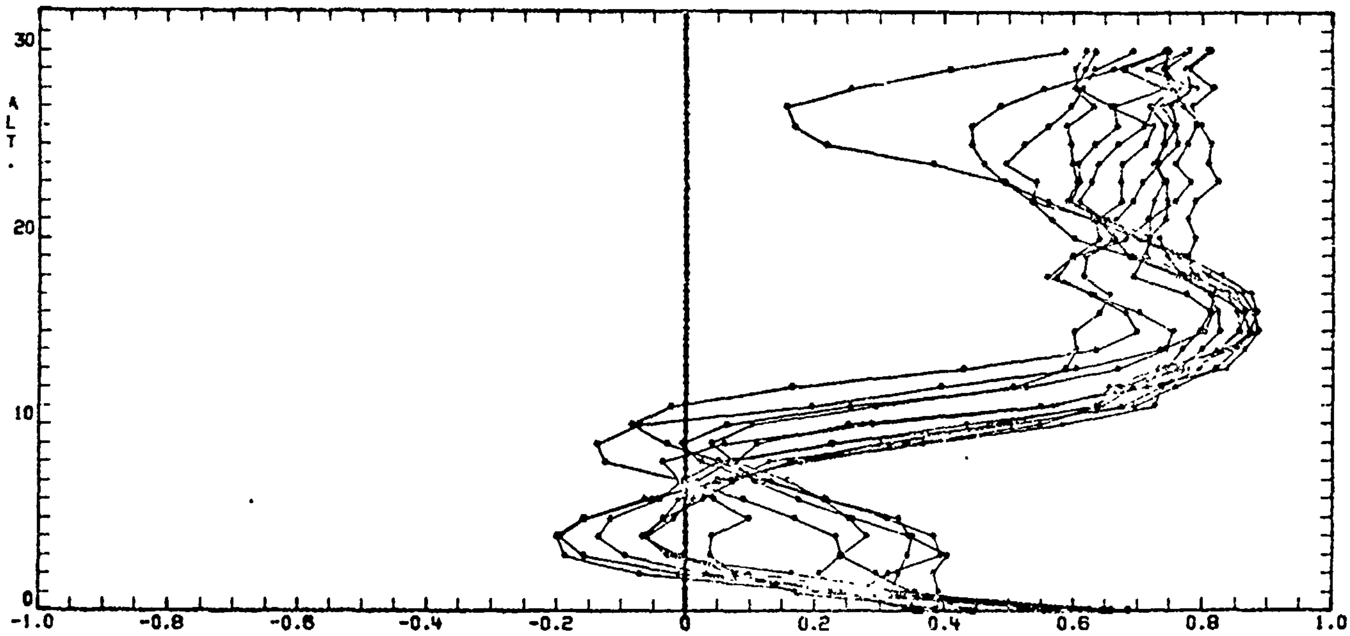


Fig. B-20

R(P,T)

STATION = 722210 ALL MONTHS

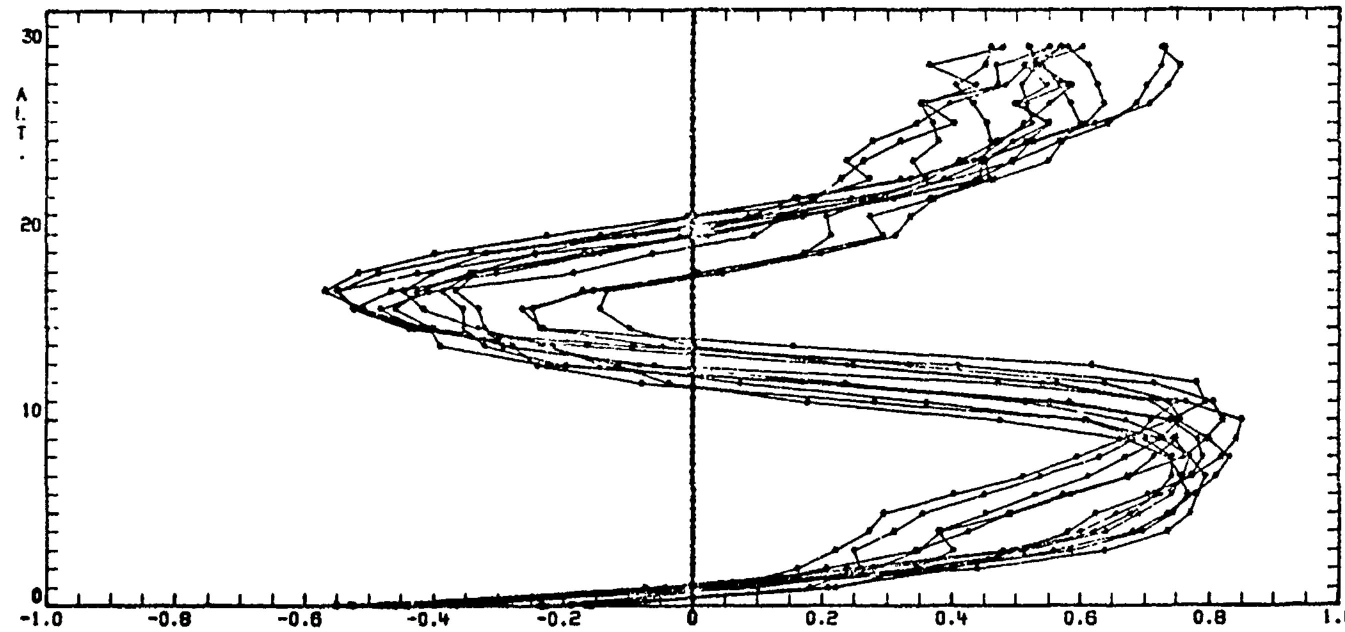


Fig. B-21

R(T,D)

STATION = 722210 ALL MONTHS

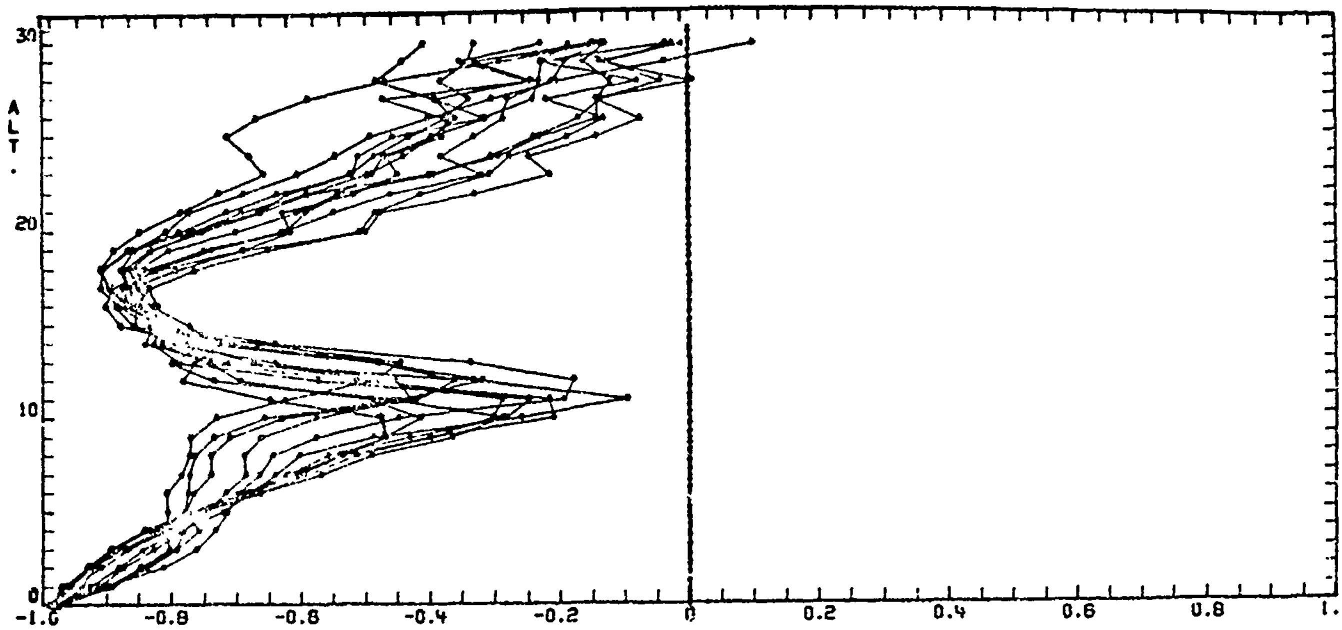


Fig. B-22